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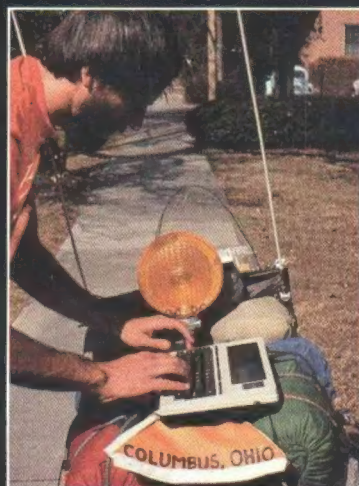
# PORTABLE 100

The magazine for  
Model 100 users

JULY  
1984

\$2.95

# A 100'S ODYSSEY ON A RECUMBENT

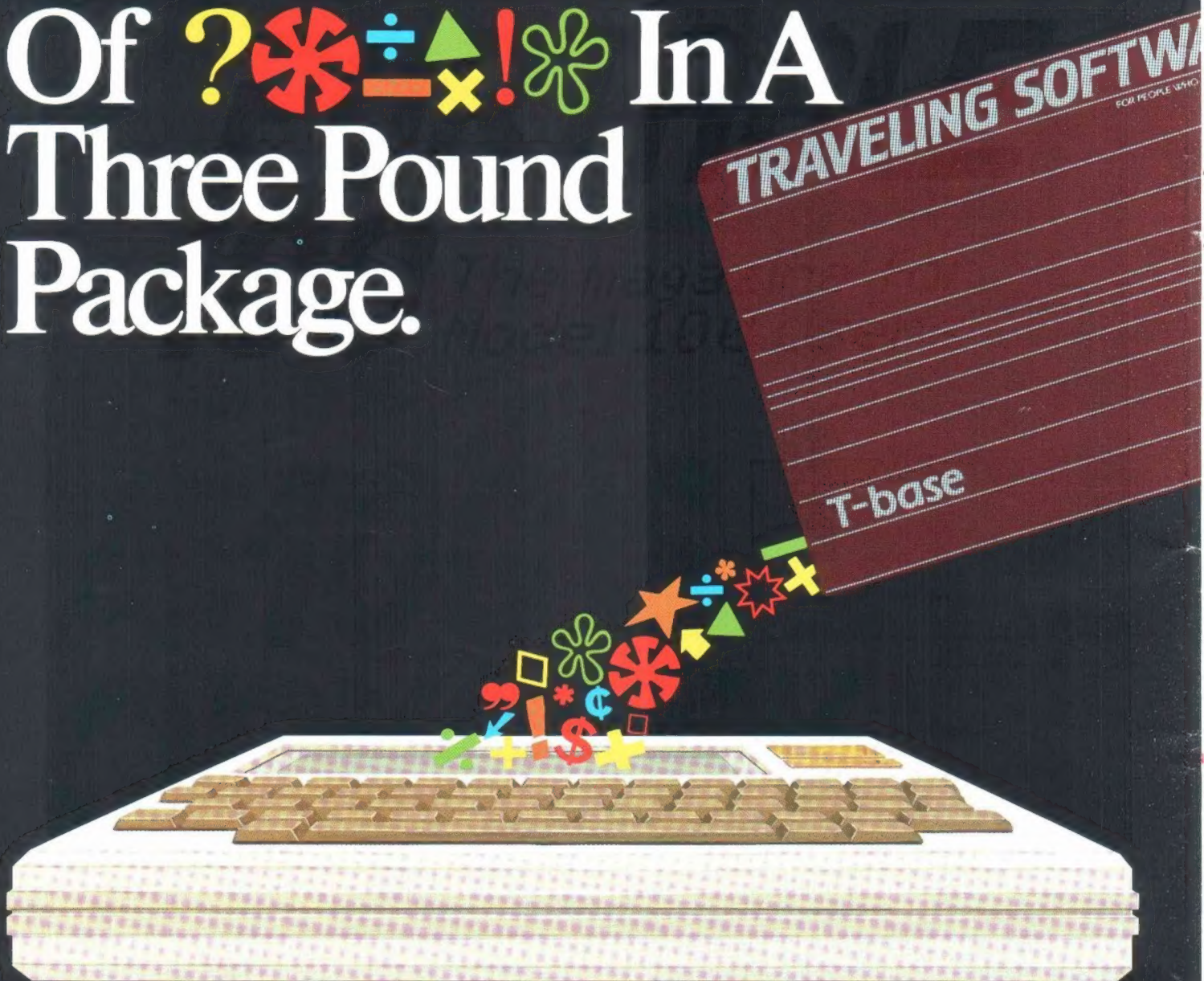


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# PORTABLE 100

JULY 1984  
VOLUME 2 NO. 7

### 63 AND NARY A BEEP WAS TRANSMITTED FROM THE PEOPLE'S REPUBLIC By Odd de Presno

Although most of us think of the Far East as a haven for computers, this traveling journalist found it no Shangri-la for his 100.

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Model 100 users

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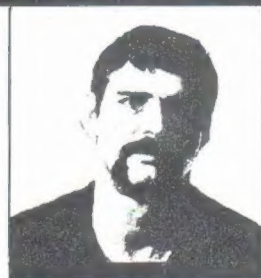
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# PREVIEW

JOHN P. MELLO JR.



## EVERYONE WANTS TO KNOW ABOUT THE LIFE EXPECTANCY OF THE 100

It seems I can't turn any more without bumping into someone asking me, "When is the Model 200 being released?" For readers outside the rumor channels, the "200" is gossip central's tag for Tandy's alleged successor to the 100. When I'm asked the question, I wonder, "What kind of technological junkies have we become?" Before we explore a tenth of the power in the 100, we want to move on.

Model 100 owners aren't the only ones asking about the 100's life expectancy. Potential owners want to know the answer to that question, too. I don't have an answer for them, but I ask them to consider this:

It could take up to a year for any new machine to develop the product base that exists for the 100 now.

Any new machine will cost more than the 100. That means a buyer will have less money to take advantage of products developed for the new machine.

Also, the 100 is becoming quite a powerful unit. With P.G. Design's 32K expansion RAM, Traveling Software's relational data base (T-base), and Microsoft's Multiplan expected to be released in ROM form this fall, the 100 could be more powerful than the base-version of its upgrade.

I admit it's fun to speculate about a new version of the 100, but I hope we don't lose sight of what we have in the process. Now let's look at what we have for you this issue.

**SHAKE-DOWN CRUISE.** Following the commissioning of a ship, it's taken on a shake-down cruise to see if it's seaworthy. It's the navy version of debugging a program. Steve Roberts is doing

that to his 100. He's set off from Columbus, OH, on a 14,000-mile trip loop around the country armed with his trusty 100 and a recumbant bicycle.

"I've wanted to travel on this scale for years, but there was always one major catch: money," Steve writes. Also, Steve's business, free-lance writing, didn't lend itself to bicycle travel — until the 100 came along. See what we means starting on page 42.

**FUNCTION KEYS.** Eight of the 100's most powerful features can be found just below its LCD in its eight function keys, but it isn't always easy to get at that power. "While the manual gives a fair explanation of the syntax of function key commands, it offers no tutorial help," explains Jesse Bob Overholt.

That meant Jesse had to find out about the function keys the hard way: through trial and error. He's ready to tell you what he's learned in his first installment of his series on "funkey stuff" starting on page 34.



**PARTI AS SVENGALI.** Six months ago, Mike Greenly, known to many of us as the intrepid Source reporter, had, in his words, "what my parents called *everything* — I had made it in the Big Apple." Suddenly, though, he decided to turn his back on "everything." Why did he do it? He did it for something accessible to every Model 100 owner.

"Telecommunications helped me end those proud days for my folks," Mike writes. He cautions readers that the same thing could happen to them. See what he means on page 52.

**MORE DVI.** Last month, Bill Walters explained a data base could be created on Tandy's Disk-Video Interface, even if random access couldn't be used to access the disk. With a fellow named Joe Example, Bill set up a data base geared to check numbers but taking up a whole disk. This month (page 25) Bill explains how to limit the data base to only a portion of the disk.

Everyone is looking for an information edge these days; one information provider promises to give you one. In Bill Loudon's Telecommunications column this issue (22), he takes a look at NewsNet, the leading provider of on-line newsletters in the United States.

Jake Commander (page 14), fresh from his series on interrupts, takes a look at languages this month, explaining why the 100's designers went with an interpreted Basic, rather than a compiled one.

When you're writing programs, one of the most tedious tasks is creating their titles. Dave Busch (page 18), in his program generator series, explains how to merge files through an automatic title generator.

**REVIEWS.** In the review department this month:

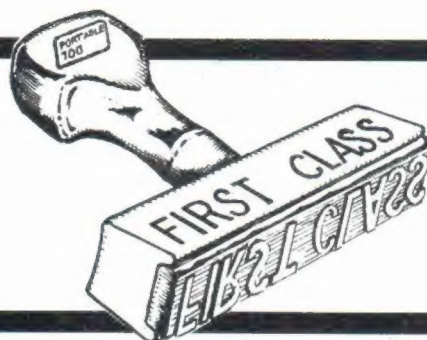
Dave Thomas looks at a blazing fast renumbering program from General Business Systems Inc., Glastonbury, CT.

Woody Liswood reviews programs to fit a curve between plotted points and a Reverse Polish Notation calculator for the 100.

Mary Jeann Batham runs through income property analysis package from American Micro Products Inc. of Richardson, TX. ◀



# MAIL.100



*Editor's Note: In addition to letters from our readers, we also include in Mail.100 letters from CompuServe and The Source. Those message writers are identified by their CompuServe (CIS ID) or Source (STC ID) identification numbers.*

## IVES OR TRAVELING PROF?

**C**an you answer this bit of confusion for me? My friends think I'm crazy, but I say Traveling Software's traveling professor is really Burl Ives.

Can't you picture fat Burl dressed up in that professor's garb, singing his operating tips into Mark Eppley's ear. In fact, I think I saw Burl pedaling rec-

ords on the tube the other day. Will we be seeing Traveling Software ads on TV soon too? You know, those ads with the likes of Box Car Willy and Slim Whitman?

Don't get me wrong. I love Traveling Software's product, but I think Box Car Willy would have been a better spokesman for it. He's constantly on the go, hopping trains and such. Think of all the times he'd need Traveling Time Manager. Just a suggestion.

A Model 100 Fanatic  
Raleigh, NC

► We can't answer your question, but have included pictures of Burl and the professor so readers can form their own opinions.

—Eds.

## STICKY SECURITY SITUATION

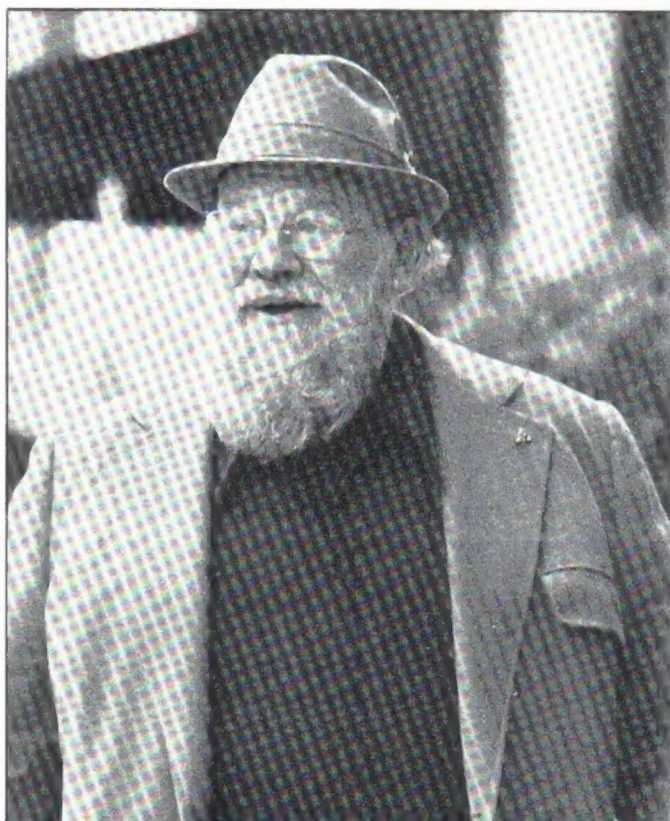
**I**'ve owned my 100 for six weeks, and I'm unabashedly in love with it. Since my job requires traveling several times a year, its portability and built-in modem mean I always have it in my briefcase. But here's the rub: Getting the 100 through airport security.

I've discovered from personal experience that airport security x-ray machines can garble the contents of RAM files. Perhaps the x-ray hazard is known to other 100 users, but I was never warned about it by my dealer.

An even less appetizing incident happened to me a few days ago. I handed my 100 to the guards to examine (avoiding the x-ray machine as many 35mm camera owners do), and was told I'd have to open the machine



*Traveling Professor*



*Burl Ives*



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- upload files from your Model 100 to your storage area, freeing up RAM and download at your convenience (**FILES**)
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case for examination. I was placed in the position of either having my files garbled by x-rays or else voiding the machine's warranty and possibly damaging a circuit board.

I suspect this guard had never seen a 100 before and was following standard orders. But he put my machine and files at risk. Have any other 100 owners successfully dealt with this?

Bernard W. Bopp  
University of Toledo  
Toledo, OH

► *Portable 100* has been told the x-ray levels of the scanners used at airports aren't high enough to damage the 100's RAM. Our staff have taken many trips with their 100s and have allowed their computers to be scanned without any damage occurring to RAM files.

On dismantling the computer, your report is the first time we've heard of any airport personnel asking that be done. We, too, would be interested in hearing from any other readers encountering that problem. —Eds.

## PFORM UPDATE

**T**hank you for reviewing the PFORM program in the June issue (page 64). The \$21.95 price includes three additional programs at no charge.

A few changes have been made to PFORM as a result of user evaluation. To update their listings, users should contact me at 813-581-3041 or at 813-531-4611, ext. 4102.

Charles J. Cressman  
Clearwater, FL

## OSBORNE-100 TYPOS

**I**'ve just read my first issue of your magazine and am quite impressed. Count me among your subscribers.

I particularly appreciated Henry Kisor's article about transferring files from the 100 to the Osborne (April 1984, page 46). I send files to my Kaypro and was bothered by the lack of line feeds and returns. A couple of CP/M programs designed to turn the files into WordStar files weren't satisfactory. Kisor's program solved my problem.

There were two typos in the listing, however. Line 30 lacked a \$ after CHR; line 80 specified CM when it should have said COM.

Sheldon L. Richman  
Springfield, VA

## HAPPY WITH US, NOT TANDY

**F**irst, while I've the chance, let me compliment you on your publication. As a commercial advertising photographer with six years of design school and work experience in Hollywood, I had assumed all magazines were as poorly written as photography magazines. Written by people paid by the word instead of content, these people never wanted to divulge too much an issue, lest they have nothing to write about the following month.

*Portable 100*, on the other hand, contains a great deal of useful information. I don't know how long you can keep this up, but I entered my subscription last week so I'd be around to find out.

Now, for the Complaints Department: From the Springfield, MA, Radio Shack, I purchased: 100 with 32K, printer and modem cable, CCR-81 cassette recorder and tapes, AC adapter, and David Lien's book, *Model 100 Portable Computer*.

## THE CASE



## FOR EVERY CASE

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Upon returning to my office and inspecting the contents, I discovered the following:

1. The computer carton was labeled, "needs work."
2. All four batteries in the 100 were dead.
3. The computer wouldn't load programs from the recorder.
4. The printer cable package had been opened and resealed.
5. The cassette recorder was missing its AC cable.
6. One of the cassettes was a Christmas demo for the Color Computer.
7. Someone's study notes were stuffed into Lien's book.

When I returned to the store to talk to the manager, they replaced the demo tape with a blank cassette, and stole an AC cord from another recorder for me.

After three employees tried unsuccessfully to load a program, it was concluded the computer did indeed "need work." I was refused a new machine and told parts would have to be ordered to repair it. I was to leave the computer and wait for their phone call in "about a week."

From this experience I've concluded the following:

1. It's impossible to purchase new equipment from this store. Everything has been played with and is shop-worn.
2. Although I had to wait two days for a technician to install the 32K chip, no one bothered to check out the machine.
3. This is obviously only a hobbyist's store.
4. Radio Shack had better get better organized if it intends to survive in this competitive industry.

John A. Cook  
Springfield, MA

## HOT IN ALASKA

We're very happy with the 100. My company uses three to complement our nine Vector Graphic workstations. The professional staff uses the 100 for word processing while traveling. We then dump the files into our main system via the modem for final editing and printing.

We've also used the 100 without hassles on Reeve Aleutian Airways, Wien Air Alaska, and Alaska Airlines. I did have a flight attendant panic, though, during an exciting instrument ap-

proach when I pulled out my pocket calculator watch to change time zones.

Thomas D. Scott II  
Anchorage, AK

## HOUSEKEEPING HINTS

Cleaning the 100's plastic screen with the same solution audiophiles use on their turntable dustcovers (*Portable 100*, December 1983, page 57) made me think: Why not a simple plastic dustcover for the 100? The machine looks as if the designers meant to have

such a cover as an accessory. It would easily slip on and off and would offer a lot of protection.

Does anyone know if such a cover exists, and where?

Bob Cramer  
STC ID TCS755

► The Southworth Co., 3527 Oak Lawn Ave., Suite 113, Dallas, TX 75219-8089, offer a hard cover for the 100 that protects the machine from spills and other accidents.

—Eds.

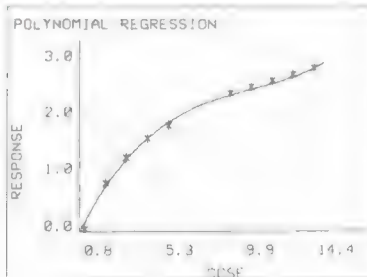
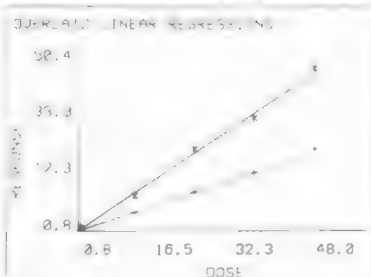
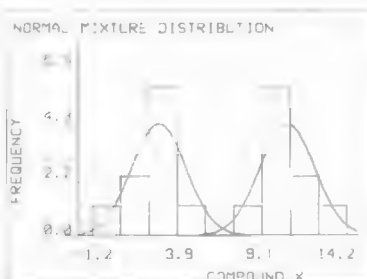
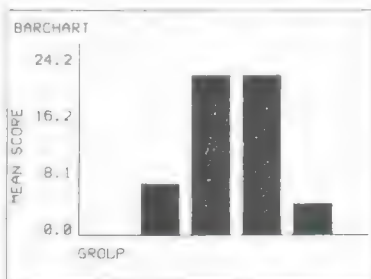
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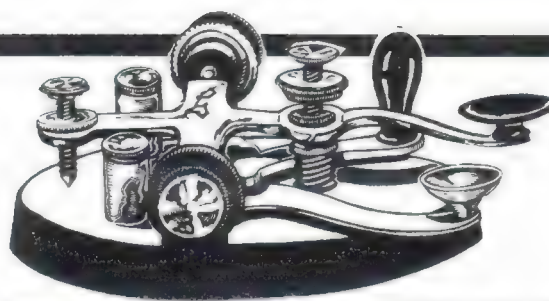
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# THE WIRE



## PORTABLES

### WILL HP 110 BE ELIXIR FOR AILING TOTE MARKET?

By JOHN P. MELLO JR.

**W**hen Hewlett-Packard trumpeted the arrival on the portable scene of its new briefcase computer in May, it vowed to be doing more than just announcing another micro; it vowed it was assuming the role of leader in portable computing. As pretentious as this may seem to many in the industry, others may find HP's audacity a shot of adrenalin for a market that's made a lot more noise than sales for most of its players.

Barrels of ink were spent on commentary heralding the rise of portable computing when Tandy introduced the Model 100 last year. Now revisionists are reassessing those analyses in the face of apparent stagnation in the market. What are they seeing?

- A low-end market (dominated by

Tandy), where sales are lower than many industry observers expected.

- A middle-market where machines are announced and still not on the market a year later (Gavilan); announced and swallowed up in distribution (Sharp); announced and relegated to the vapor zone (Dumont Magnum).
- A high-end of the market that almost lost its only player (Grid) had it not been for a hefty federal contract.

Into this bog steps Hewlett-Packard, who is contending someone has to take the wheel before the ship goes aground. Unlike its competitors in the portable market, HP recognizes (as Apple does) computing's grown up. The new ball game is marketing, and HP has pledged to play the new game with a vengeance.

"We are planning an aggressive marketing campaign to make the benefits of portability clear to potential users and to establish HP as the leader in truly portable computers," declared HP Executive Vice President Paul C. Ely Jr. in a statement.

He said an "ambitious" multi-million dollar advertising campaign using television and print will be launched this summer to back up the introduction of "The Portable," as HP calls its \$2995 machine.

But HP (like Apple) is offering the public more than marketing hype, because their machine is really *the* portable in

their end of the market (just like the Model 100 is *the* portable in its end). Look at the HP portable's features:

- Runs MS-DOS 2.11;
- Contains Lotus 1-2-3 (among other programs) in a 384K ROM;
- Has 272K of RAM;
- Runs on a CMOS 8086 16-bit microprocessor running at 5.33 MHz (the Model 100's 8-bit 80C85 microprocessor runs at 2.4 MHz);
- Has a 16-line by 80-character LCD display;
- Includes 300-baud, direct-connect, auto-answer, auto-dial modem;
- Operates on a lead-acid battery pack good for 16 hours between recharges;
- Has Typewriter-style keyboard with 75 low-noise keys; and
- Has add-on battery-powered 3.5-inch disk drive with a 710K capacity.

Will this impressive machine and the equally impressive marketing pledge behind it be enough to stir the sleeping giant analysts claim the portable computer market is? Everyone should know soon. ◀

## JAPAN INC.

### OEM CHANNELS OFFER ALTERNATIVE FOR JAPAN

**T**he release of the Model 100 a year ago may mean more than the opening of the age of affordable portable computing — especially to the Japanese.

Japan, so successful in semiconductor and printer manufacturing, has had its problems hawking personal computers in the United States. It has been looking for a strategy to crack the American market for years. A strategy lesson may lie in the introduction of the 100, a computer manufactured by a Japanese company (Kyocera) and sold by an American one (Tandy).

The lesson wasn't lost on Mitsui, who has enlisted Kaypro to market an up-scale, IBM-compatible portable in the United States. Neither was it lost on Leading Edge or Sperry Corporation, both selling an IBM-compatible desktop manufactured by Mitsubishi.



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Like Kyocera, whose portable is sold in the United States by Tandy, Olivetti, and NEC, Mitsui plans to sell its computer strictly on an OEM basis. "This is OEM only. We have no plans to market it under our own name," Mitsuo Kurobe, product manager for Mitsui and Co. USA, told *Portable 100*. He added his firm's agreement with Kaypro isn't an exclusive one, and the computer could be sold to other companies hoping to sell the machines through Fortune-1000-type channels.

John Hemphill, senior technology consultant for Future Computing, said the OEM approach adopted by Kyocera, Mitsui, and Mitsubishi is a "strategy to get more business" but "nothing new and different" from relationships between Japanese and American companies in the past.

One of Japan's greatest success stories is how it captured a significant share of the American automobile market. But personal computers aren't automobiles, explained Michael Young, associate professor of law and director of the Center for Japanese Legal Studies at Columbia University in New York.

When the Japanese entered the auto market, he said, they weren't really in direct competition with any American company. "Here," he explained, "they're actually in direct competition." Add to that, he continued, "profit margin is lower, the market is a lot more volatile, and product lines are short-lived. For all those reasons, it makes sense, from their perspective, to link into pre-existing distribution networks as opposed to going out and developing their own distribution networks."

"It is also possible," he added, "that the Japanese are using these distribution channels as an early sort of learning process. The learning curve in this is pretty steep. I suspect that in not too long a time they will have learned an awful lot about how to take advantage of existing distribution channels. Before long, one may find them going out on their own. Instead of finding them in Radio Shack, you'll find them in the computer stores under their own name." ◀

—John Mello

### COMPUTING ABROAD

## NORWEGIAN TELEVERKET TO MARKET CCITT MEWS

By ODD DE PRESNO

**T**eleverket, AT&T's counterpart in Norway, has decided to sell a U.S. compatible Model 100 in that country.

Model 100s currently sold in Europe have no built-in modem or autodialer and their ROM is different. The U.S. version has these functions, but they are laid out according to the rules of the Bell system. In Europe, however, all modems are CCITT.

The Model 100s currently sold in the United States cannot communicate via their built-in modem in Europe, unless the other party is also using a Bell modem.



The Norwegian state-owned telephone company, Televerket, will sell the TRS-80 Model 100, with full U.S. capabilities including built-in modem adapted to CCITT, through its country-wide chain of retail shops.

With its built-in modem, the Norwegian 100 could be used in most European countries. However, the built-in modem is not formally approved for use outside Norway.

American Model 100s can be modified for European use.

If you live in Germany, you can buy an adaption to German Post rules through RsK D. Koepke, Bitzenstrasse 11, D-5464 Asbach Ww., West Germany. For DM 3.500 (\$130), you can buy a TELSTAR-unit with built-in modem, accoustic cups, post license, rechargeable batteries, and an AC 220v adapter.

Koepke also sells a CCITT/BELL kit for self-soldering for \$45 without, however, a license from the German Post.

The Norwegian Model 100 with 32K RAM and direct connect cables will sell for NOK 15.600 including 20 percent purchase tax (around \$2100). Quite a price, but again, with full communication capabilities and Scandinavian keyboard.

In the United Kingdom a 24K model sells for about 600 pounds (\$877) and an 8K for about 399 pounds (\$580) — depending on exchange rates. But it would be as similar to an American 100 as a NEC 8201A. Consequently, you could not download public domain software from CompuServe and run it on Europe 100 without rewriting some of the code.

Televerket decided it wanted to go the U.S. way as far as possible. The software on the Norwegian 100 will be almost identical to the American 100.

The first batch reached the shops in Norway by the end of March. These units have the modem and automatic dial-up built into them, and the proper software to make them work within the Norwegian telephone regulations.

The Norwegian characters and keyboard capabilities will first reach the public in June or July. Those who buy the initial version may have their units upgraded free of charge.

The later version will have new keycaps and a new ROM. The new ROM has the option of having all the Norwegian characters on the screen. These characters will reside in the extended ASCII range.

The setup is such that you can also change to French characters, if you go to France, or to Swedish characters, if you go to Sweden. And of course, to standard U.S. characters.

"The ROM is designed to make the machine compatible with all software, including machine-language programs, that have already been written for the Model 100," said an official of Tandy Europe.

"There may be problems with M/L programs that you have written yourself, if you put your code where we have put our special things. We did not touch the high memory. A small section of the low memory will be protected to take care of the translations.

"This will be automatic, depending on the size of your machine. On a 32K model we will take the very lowest portion, 1K at the most. And there is no way the user can get that low.

"The Norwegian version will be standard U.S. ROM with additional software. All the ROM call addresses that are published are the same as in the U.S. version.

This makes "The Viking Version" an attractive alternative for people traveling around Europe. In the meantime Tandy is busy with next step, Disk-Video Interface. It will be in the shops by early summer, Tandy said. ◀

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# PORTABLE COMMANDER

JAKE COMMANDER



## THE DIFFERENCE BETWIXT BASIC INTERPRETERS, COMPILERS, TRANSLATORS

**T**he Model 100, amongst its innards, contains a Basic interpreter. To me and presumably many other people, this is the single most powerful application provided in ROM.

But was using an interpreted language the wisest choice? What are the advantages with, say, a compiler? Could a compiler have been provided instead? And what the heck is the difference between a compiler, an interpreter, and a translator? This month I'll be presenting a picture which hopefully will clear up the confusion.

**INTERPRETERS.** An interpreter is a computer program. Its sole function is to scan instructions, usually in the form of ASCII text, and take action according to each one. This process is inherently slow because the interpreter has to lexically scan the text and try to make sense of it piece-by-piece. It does this by expecting the programmer to use a certain syntax containing the equivalent of nouns and verbs or subjects and objects.

This process involves scanning its internal dictionary to see if a word is in its vocabulary, and then jumping to a pre-determined routine to do some work. If the syntax is wrong, the interpreter has no way of knowing what to do. So it

does the only thing it knows: Stops dead with an error report.

This process continues all the time with the interpreter following the code like a train running along tracks and switching when told to do so. The form of syntax it follows comprises the language used (Basic, in the case of the Model 100).

**STRAIGHTFORWARD.** Although an interpreter's main drawback is its slowness, the good thing about it is its high degree of interaction with the user. Since the routines following the interpretation already exist in a debugged form in ROM, the only crashes that can occur can be handled in a user-friendly manner.

Not only that, but the error report can be generated in the program at the exact point the error occurs. This helps debugging greatly by leaving an ailing program in the state it was just prior to the bug. Thus, it's a direct process to trace the flow of code to see what went wrong and where.

**COMPILERS.** The difference between compilers and interpreters is compilers read the text of the program. Instead of executing the program, as the inter-

preter does, it generates code (normally machine code). This code can be run independent of the compiler.

That's the theory anyway. In real life, the compiler usually leaves some of itself behind. The "some of itself" left behind contains many routines to be used to help the generated code perform its work. It'll contain things like floating point math routines, probably containing all the code for transcendental functions like sine, cosine, and tangent. The whole slew of routines is referred to as a run-time library and is always present in some form or another when the compiled object code is produced.

This explains one of the drawbacks of compilers: The machine-code program produced can be larger than the source code text because of the size of the run-time library. Not only that, but some vendors of compilers require a royalty on any object code you sell because it contains a great deal of their own code. Why this should be treated any differently from similar routines present in an interpreter is a mystery.

**DRAWBACKS.** The obvious advantage of a compiler is speed of execution. Most generate a machine-code program as their output resulting in code running at machine-code speed with no interpreter having to scan and analyze anything.

One caveat to this, though, is no compiler is capable of producing code as compact and efficient as a human programmer can. Machine-code program-





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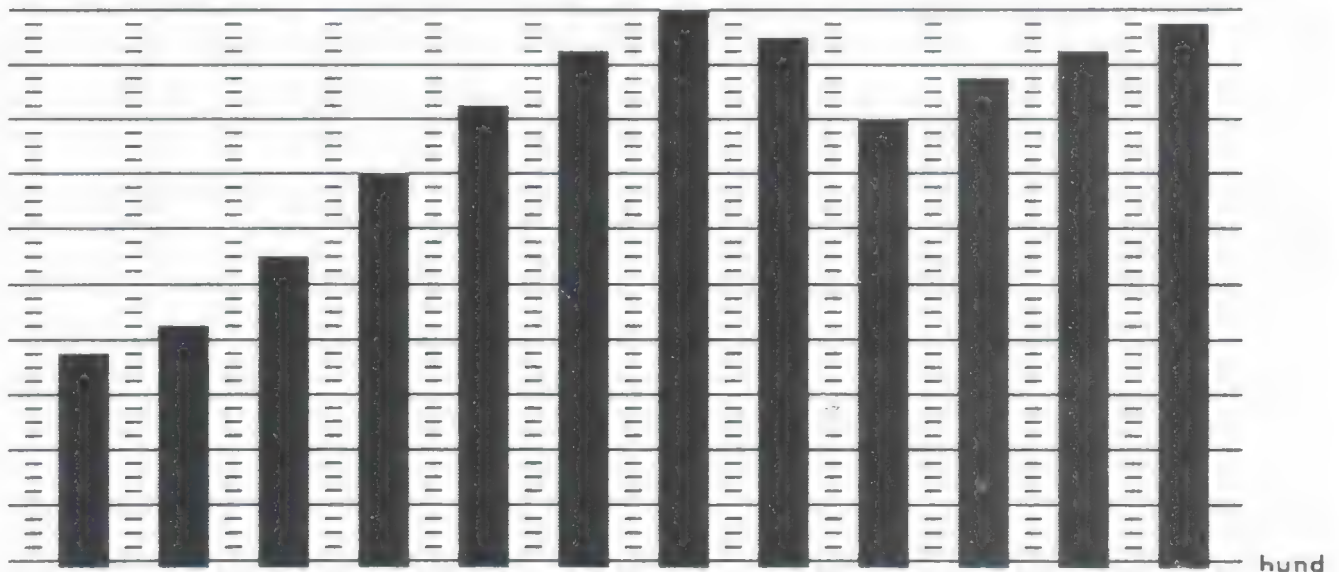
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mers' jobs are still safe despite the attraction of generating machine code with a compiler.

There's another disadvantage with a compiler. Instead of executing code with simple run command, or equivalent, a two-stage process has to start.

**RISKY RUN.** First, the compiler has to read the source code in order to generate the object code. This is the stage when any syntax errors will be reported. Depending on the type of error, the compiler may continue producing object code after giving a warning, or it may abort altogether rather than produce code which won't work.

The source code is dumped back into the lap of the programmer. Once this initial compilation is successfully completed, the second stage can take place.

Here the object program is run. Any logic errors in the program will cause a crash at some point. But this time it'll be at machine-code speed with no friendly interpreter to help with a cryptic message. Anything might happen: Wrong results to a system crash.

**TRANSLATOR.** So what about this mysterious animal? It's just a generic term for any program that converts source code in one language to source code in another: Pascal to Fortran for example. Its main use is for rewriting programs in a language you intend to supercede. Once the translation is performed, the resultant code can be interpreted or compiled in the usual way.

The uses for such a program on a 100 are minimal. Though there's no reason why the machine couldn't perform any translation if you wanted to translate code for use on another machine.

**EASY WAY OUT.** So could the 100 designers have gone with a compiler instead of an interpreter? Sure. Except with the wide user-base such a machine has attracted, the more interactive the programming language the better. Despite their drawbacks, interpreters offer the best lowest-common-denominator solution to providing a language on any machine.

Good programmers can still make them perform with astonishing efficiency. So regardless of the fact I'd personally enjoy the use of a compiler on my 100, I'm secretly glad they provided the easy way out. ◀



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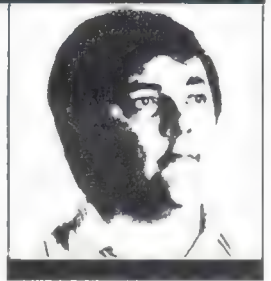
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# BUSCH LEAGUE

DAVID BUSCH



## AUTO PROGRAM — PART 3: AUTO-GENERATE TITLES TO YOUR PRECIOUS PROGRAMS

*This is the third in a series of columns by Dave showing Portable 100 readers how to construct a program generator. The columns are based on The Automatic TRS-80 by Dave and published by Tab Books.*

**M**aking a few simple changes in an existing program is kid stuff when compared to generating a new, never-before-existing program line from your own parameters. That's the function of *Titler*.

**SHARE WITH A FRIEND.** By separating program title blocks that can be merged with your own programs, you don't have to tediously write the program lines yourself, format the title block, nor even supply your name and address every time. The program does that for you. As an added feature, your friends also can use the program by supplying their own names.

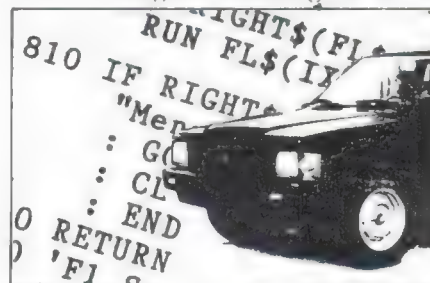
This last capability is carried out through "default" values. That is, the programmer defines what the storing name, address, and city will be of the variables. Every time the program is run, simply hit enter when asked whether or not a new name and address should be input. The question is posed in line 120. Then an INKEY\$ loop repeats until the operator presses a key, or hits enter. If "N" was pressed, or ENTER (CHR\$(13)), then the program drops down to line 280, and N\$, AD\$, and CT\$ remain as they were defined in lines 70 to 90. The default values are used.

If "Y" or some other key is pressed, however, the program will ask for a name, address, city, state, and zip, and

assemble the string variables N\$, AD\$, or CT\$ on its own. In that way, both a regular user can be accommodated, while leaving a path open for a friend to use the program as well.

**LONGEST STRING.** Next, the user is asked for the title of the program, and this is stored in TITLE\$. The program checks to see which of the four: TITLE\$, the name, address, or city is the longest. The longest of the four strings determines how wide the title block will be. This width, A, is defined in line 350 as the length of the longest string plus four. The extra four characters will leave room for a space at each end of the longest string, plus an asterisk used as the border.

A RAM file named *Title* is opened, and a subroutine at line 760 accessed to produce a string equal to the next line number that will be used in our mini-program. What this program does is increment a counter, LC, each time it's called. Then, LN\$ is formed by converting the counter LC to a string value, adding an apostrophe (because our title block will consist of remarks), and a space, CHR\$(32). Then the subroutine returns to the main program. There LN\$ is added to a string equal to A+2 in length, consisting of all as-



terisks. So, the first line might look something like this:

```
1 *****
```

That line is printed to the RAM in line 400.

**CENTERED.** Then, the subroutine at 760 is called again, and a new line is formed similarly. This line consists of a line number that is one greater than the last, the apostrophe, an asterisk, followed by spaces equal to A, and another asterisk. This line will look like this:

```
2 ***
```

The following line will contain the title itself, and will have an asterisk, some spaces, the title, some more spaces, and another asterisk. The number of spaces fore and aft will be divided as equally as possible at each end, so the title will be centered.

These are calculated by subtracting the length of the title from A, dividing that by two, and assigning that value to the number of spaces preceding the title, B1. The number of spaces following is the number remaining after subtracting B1 from B. This is done, instead of simply dividing B by two, because the result won't always be even. It is sometimes necessary to make B1 one space larger than B.

This centering procedure is repeated every line when the name, address, and city are included in the title block. The block is finished when a program line identical to line 1 is written to RAM.

**A CINCH.** The last step is to close the file, and then print instructions to the user to renumber the target program so the first line number is higher than 10, and then merge with the title file.

There, we've created a program from nothing ... next month, though, things will get more complicated. ◀



```

10 *****
20 * *
30 * * Program Title *
40 * *
50 *****
60 CLEAR 1000
   : MAX FILES =1

65 ' *** Defaults ***
70 N$="Your Name Here"
80 AD$="Your Address Here"
90 CT$="Your City, State, Zip"
100 CLS
   : PRINT

110 PRINT "Title Block Writer"
120 PRINT
   : PRINT "Enter Name and Address?"
130 PRINT "(Just Hit <ENTER> to use
   Defaults)"
140 A$=INKEY$
   : IF A$="" GOTO 140
150 IF A$=CHR$(13) OR A$="N" OR A$=
   "n" GOTO 280

155 ' *** Enter Name, etc. ***
160 CLS
   : PRINT
170 PRINT "Enter name : "
180 INPUT N$
190 PRINT "Enter Address : "
200 INPUT AD$
210 PRINT "Enter City : "
220 INPUT C$
230 PRINT "Enter State : "
240 INPUT S$
250 PRINT "Enter Zip Code : "
260 INPUT Z$
270 CT$=C$+"", "+S$+"", "+Z$"

280 CLS
   : PRINT
290 PRINT "Enter title of program : "
300 INPUT TITLE$
310 A=LEN(TITLE$)
320 IF LEN(N$)>A THEN A=LEN(N$)
330 IF LEN(AD$)>A THEN A=LEN(AD$)
340 IF LEN(CT$)>A THEN A=LEN(CT$)
350 A=A+4

355 ' *** Open file ***
360 OPEN "TITLE" FOR OUTPUT AS #1
370 CLS
380 GOSUB 760
390 LN$=LN$+STRING$(A+2,"*")
400 PRINT #1, LN$
410 GOSUB 760
420 LN$=LN$+"*"+STRING$(A,32)+"*"
430 PRINT #1, LN$

```

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\* RPN is a method of entering algebraic  
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of parentheses.



```

440 GOSUB 760
450 B=A-LEN(TITLE$)
    : B1=INT(B/2)
    : B2=B-B1
460 LN$=LN$+"*"+STRING$(B1,3
    2)+TITLE$+STRING$(B2,32)+"*"
470 PRINT #1,LN$
480 GOSUB 760
490 LN$=LN$+"*"+STRING$(A,32)+"*"
500 PRINT #1,LN$
510 GOSUB 760
520 B=A-LEN(N$)
    : B1=INT(B/2)
    : B2=B-B1
530 LN$=LN$+"*"+STRING$(B1,3
    2)+N$+STRING$(B2,32)+"*"
540 PRINT #1,LN$
550 GOSUB 760
560 B=A-LEN(AD$)
    : B1=INT(B/2)
    : B2=B-B1
570 LN$=LN$+"*"+STRING$(B1,3
    2)+AD$+STRING$(B2,32)+"*"
580 PRINT #1,LN$
590 GOSUB 760
600 B=A-LEN(CT$)
    : B1=INT(B/2)
    : B2=B-B1
610 LN$=LN$+"*"+STRING$(B1,3
    2)+CT$+STRING$(B2,32)+"*"
620 PRINT #1,LN$
630 GOSUB 760
640 LN$=LN$+"*"+STRING$(A,32)+"*"
650 PRINT #1,LN$
660 GOSUB 760
670 LN$=LN$+STRING$(A+2,"*")
680 PRINT #1,LN$
690 CLOSE
695 ' *** Final Instructions ***
700 CLS
    : PRINT
710 PRINT "Renumber your target
    program so that first"
720 PRINT "line number is higher than
    10, then type"
730 PRINT "MERGE ";CHR$(34);
    "RAM:TITLE";CHR$(34);"."
740 PRINT
750 END
755 ' *** Increment Line numbers ***
760 LC=LC+1
    : LN$=STR$(LC)+" "+CHR$(32)
770 RETURN

```

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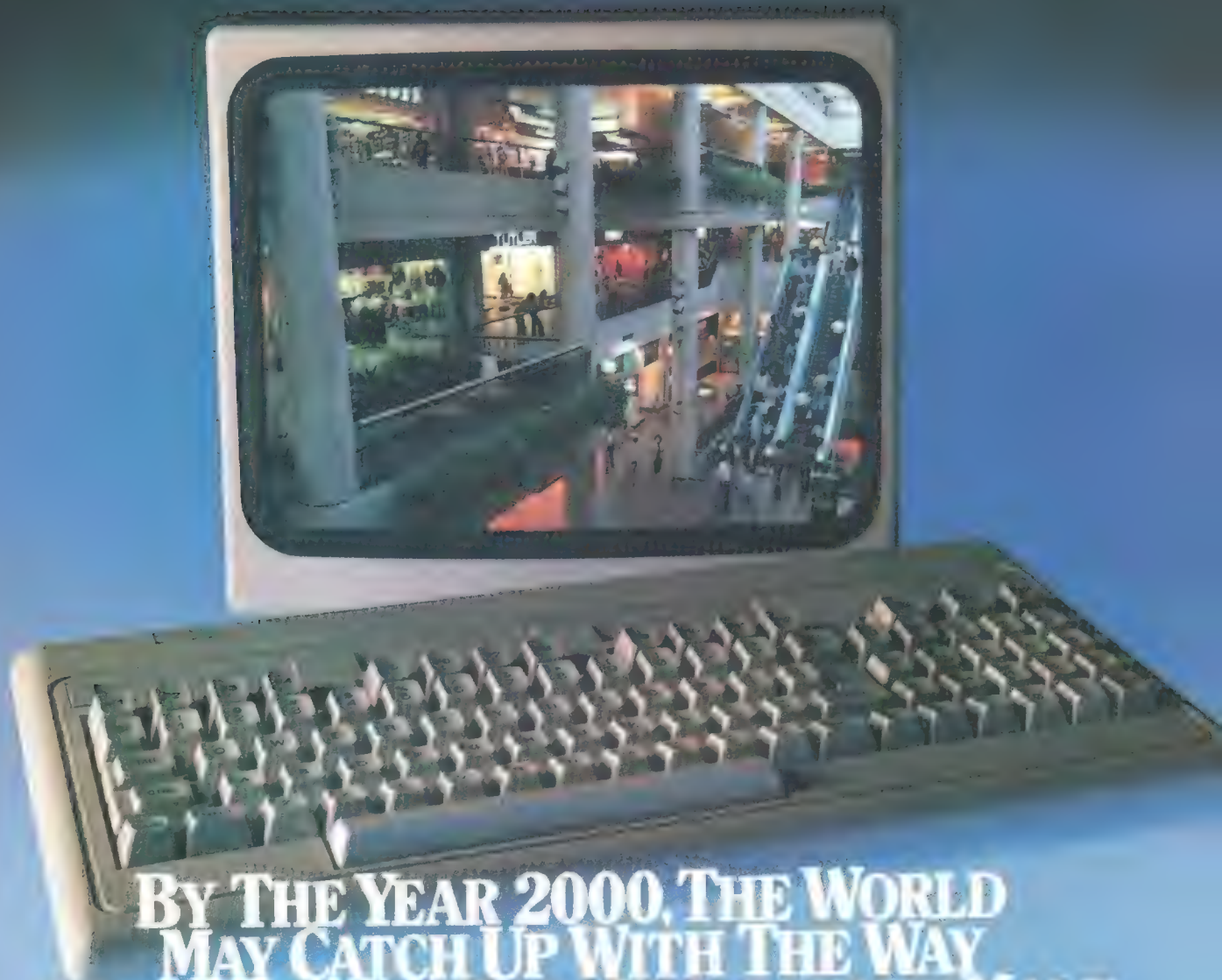
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## NEWSNET COSTS MORE THAN OTHER SERVICES BUT ITS QUICKNESS KEEPS COSTS DOWN

**W**ith the overwhelming quantity of magazines being published today in computing and other specialized business fields, NewsNet has emerged as the leader of on-line newsletter data bases.

The NewsNet data base contains more than 200 newsletters from over 100 independent publishers. It's accessible at 300 or 1200 baud with standard asynchronous terminals or computers with asynchronous terminal software. (With the 100, set your TELCOM Stat to M7E1E, 37E1E.)

NewsNet operates in a full-duplex and Xon/Xoff (flow control) mode. Designed for business users, however, it only supports an 80-character by 24-line video screen. Although I found this format hard reading while on line with my 100, downloading the information for printing produced professional copy.

**AVAILABLE SERVICES.** NewsNet services are organized into 34 industry categories. Each newsletter is assigned a specific service code and you can search either by a specific code or by the general industry category (table 1).

For those interested in the computer and telecommunications industry, NewsNet offers 46 separate newsletter services. Some of the services available in the Electronics and Computers (EC) industry are quite impressive (table 2).

**USING NEWSNET.** NewsNet is a command-driven system, although if you press return, you'll be given a list of commands that are valid. It's available directly, or through Tymnet, Uninet, or Telenet (table 3).

On NewsNet, your ID number and your password are entered on the same line followed by return. For Example, ID NET9999 password enter. Many NewsNet passwords use control characters so they don't display on your screen. Remember to hold down the control key when you enter your pass-

word. My first attempt at using NewsNet was unsuccessful because I didn't remember to do this. However, after a quick call to their customer service department, I was on line. (Although I must admit, I am still blushing.)

A sample log-in session using Tele-net is described in exhibit 1.

```
Terminal= D1
@C 215 66
215 66 CONNECTED
Welcome to NewsNet
ID NET9999 password
NET9999 (user 37) logged in
Wednesday, 11 Apr 84 14:07:28
Welcome to PRIMOS version 19.2
Last log in Tuesday, 20 Mar 84
18:23:16
```

Exhibit 1. Sample Log On.

INDUSTRY	CATEGORY	NEWSLETTERS
Advertising and Marketing	AD	2
Aerospace	AE	5
Automotive	AU	2
Building and Construction	BC	3
Chemical	CH	3
Corporate Communications	CC	2
Education	ED	1
Electronics and Computers	EC	20
Energy	EY	6
Entertainment and Leisure	EL	6
Environment	EV	4
Farming and Food	FF	6
Finance and Accounting	FI	12
General Business	GB	3
Government and Regulatory	GT	9
Health and Hospitals	HH	3
Insurance	IN	1
International	IT	6
Investment	IV	17
Law	LA	1
Management	MT	4
Metals and Mining	MM	1
Office	OF	3
Politics	PO	2
Public Relations	PR	5
Publishing and Broadcasting	PB	15
Real Estate	RE	1
Research and Development	RD	7
Retailing	RG	1
Social Sciences	SS	6
Taxation	TX	8
Telecommunications	TE	26
United Press International	UP	5

Table 1. Newsletters By Topic.



## Introducing REMOTE CONTROL The link between portable computers and your IBM PC.



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**2. Direct connection:** Move files at high speed over a standard RS232 cable between your IBM PC and your portable computer. Take your portable computer to a meeting and simply transfer your notes into your IBM PC when you return to the office. A null modem cable is included with REMOTE CONTROL.

**3. Host mode:** This is great. Now you can communicate with and control your unattended IBM PC over telephone lines from your portable computer keyboard. Move files, execute DOS commands and run stand-alone programs from your remote site as easily as if you were at your desk. For example: You're travelling with a portable computer. Late at night you dial your office PC with your portable. REMOTE CONTROL answers your call and gives you control

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NEWSLETTER	CATEGORY	ISSUES
Advanced Computing	EC	12
Annex Computer Report	EC	5
The Business Computer	EC	22
The Computer Cookbook	EC	10
Computer Insider	EC	25
E-COM News	EC	24
IBM Outlook	EC	26
IBM Watch	EC	17
Micro Moonlighter	EC	11
Mini/Micro Bulletin	EC	9
Modem Notes	EC	23
Personal Comp. Today	EC	3
The Seybold Report	EC	20
UNIQUE (Unix/C advisor)	EC	13

Table 2. Computer Newsletters.

NETWORK	PROMPT	RESPONSE
Tymenet	Terminal Identifier	A<ENTER> NET<ENTER>
Telenet		<ENTER><ENTER><ENTER> D1 C 21566
Uninet	Terminal = @ L? service?	<ENTER><ENTER> NET

Table 3. Log-On Sequences.

*** COMMAND MENU ***	
READ	Read full text
SCAN	Scan headlines
SEARCH	Search for key words
PAGING	Set terminal to page-at-a-time display
NOPAGE	Set terminal to continuous display
FLASH	NewsFlash Service
INDEX	Index, cross-referenced by industry
PRICES	Price list
INFO	Information Services
LIBRARY	Library of sample issues
MAIL	Feedback to publishers/NewsNet
ORDER	Order services or products
USER	User services
HELP	General instructions
BACK	Return to previous prompt
STOP	Return to beginning of function
QUIT	Return to command level prompt
OFF	Exit NewsNet, sign off

Table 4. NewsNet Commands.

**COMMANDS.** Pressing return or enter at this point will display a list of commands that NewsNet is expecting. There are essentially three major commands: read, scan, and search. Read will display the full text of the newsletter specified; scan will display the headlines in the newsletter specified; search will allow you to search the newsletter for topics that contain specified keywords.

Pressing enter will display the full list of available commands (table 4).

**HEADLINE SCAN.** The easiest feature to use is the scan function. Scan prints the headlines and the first few lines of

text for each headline in your selected newsletter. At the command prompt, enter scan and the newsletter code that you wish to examine.

I entered EC25 for the *Computer Insider*. This contains trends, tips, analysis, and financial data about the likely winners in the microcomputer industry from a behind-the-scenes perspective.

I chose "latest" for the most recent information. You may also enter all or a specific date or date range. NewsNet will provide a numbered list of the headlines and then will display the prompt: Enter item numbers to read, again, more for more issues, back, stop, or help. You may choose to read a single item by choosing its headline

number, all the items associated with the headlines on your display by typing all, or the next items by typing more.

**TEXT SEARCH.** With NewsNet's full-text search function you can specify a series of keywords and use Boolean AND or OR functions to broaden or narrow your search.

I found search confusing at first and would recommend you become familiar with the read and scan commands before you try this feature.

On one occasion, after I was notified it found zero occurrences for my search term, I was given the enter keyword prompt again. Attempting to type in end or stop only resulted in another search for the keyword end; not what I wanted at all!

On another occasion, I entered control-p (which was ignored). After several attempts to continue my search, I had to hang up and log in again.

This isn't necessarily a major drawback of NewsNet, as the rest of the service functions well and is indeed a worthwhile value.

**CLIPPING SERVICE.** NewsNet also offers a clipping-type service called NewsFlash. This allows you to specify keywords that will be compared to all new material added to the NewsNet data base. NewsFlash will notify you every time it finds a match between your keywords and incoming news items.

NewsNet costs a little more than the other small business information services, but its speed, and full-text search capabilities should keep your access time and costs to a minimum.

**RATES.** Basic 300 baud service (8 a.m.—8 p.m. Eastern time) is \$24 per hour. The evening 300 baud rate (8 p.m.—8 a.m. Eastern time) is \$18 per hour. Rates for 1200 baud service are 100 percent higher. There's also a monthly minimum of \$15 and a minimum subscription period of 30 days. Many newsletters also have premiums associated to the read times of their services. You should examine the current price lists with the prices command before you access a new newsletter.

For more information on NewsNet, call NewsNet Customer Service at 800-345-1301 or 215-527-8030 in Pennsylvania. Or you may write to: NewsNet, 945 Haverford Rd., Bryn Mawr, PA 19010. ◀





## DVI DATA BASE — PART 2: STORING MORE THAN YOUR DATA BASE ON YOUR DISK

Last month I talked about a simple data base for Joe Example's personal finances. Joe was pretty happy about the first result, but he wanted the ability to be able to use the same disk for storing other files too. Joe's the frugal type and likes to keep waste to a minimum. Besides, if he had access to the data from other programs, that'd be even better. This way, he could write programs for managing his finances and have them saved on the same disk.

The disk-video's owner's manual has some information on the structure of the directory but it certainly wasn't written with a novice in mind. Joe persevered though and now has an answer to his problem. Let's see what he

found out about creating files on the disk using DSKI\$ and DSKO\$.

**DISK MAKE UP.** In order for this entire discussion to make sense, let's decipher what the owner's manual says about the disk and it's organization.

The disk is divided into 40 concentric circles, each called a track. These tracks are numbered from 0 to 39. I know it doesn't make any sense, but it's one of the strange conventions disk drives have been living with since their introduction, and it's literally too late to do anything about it.

Each track is subdivided into 18 sectors. These sectors are numbered from 1 to 18. Since all sectors are essentially identical, the disk-drive mechanism

needs a reference point to determine where sector one is on the disk.

**INDEX HOLE.** There's a small hole in the disk near the larger center hole. This small hole is the index hole and if you carefully rotate the magnetic media inside the jacket, you'll eventually see a small hole appear. When the disk is inside the disk-drive mechanism, a hub clamps the large center hole and spins the inner magnetic media.

At each revolution this index hole cycles underneath the small opening in the jacket. An optical sensor in the drive mechanism detects the hole and tells the drive-electronics sector one is under the disk head.

Notice in figure 1 the sector numbers aren't consecutive. In order to transfer information more rapidly, the disk-drive unit skips three sectors before writing to disk information consuming more than one disk sector.

**ONE-THIRD TIME.** Since information is written or read to disk in half-sectors,

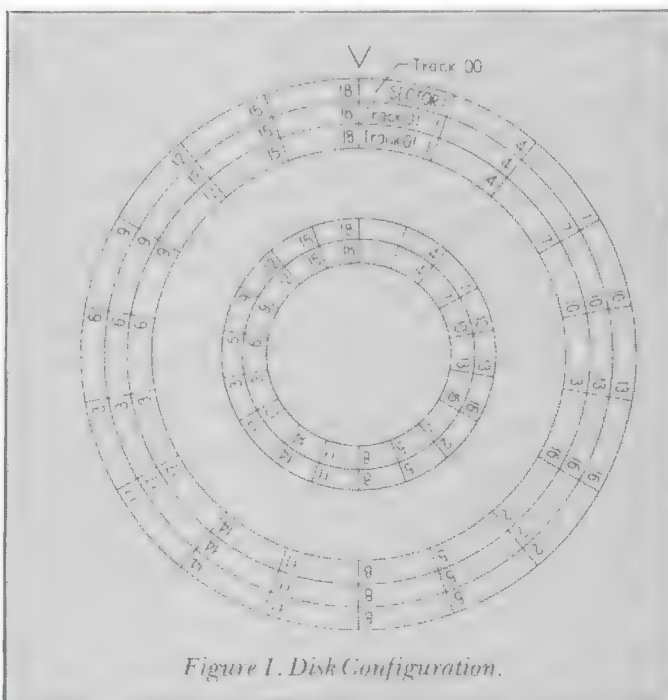


Figure 1. Disk Configuration.

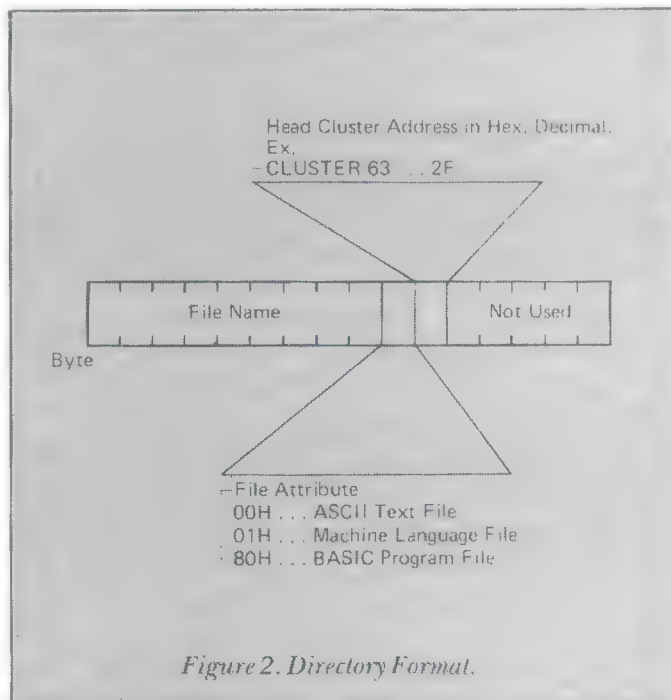


Figure 2. Directory Format.



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by the time the computer is ready to read or write the second sector's worth of data, the disk has traveled farther than the next sector. If the operating system insisted files larger than one sector had to reside on consecutive sectors, then reading this information would require three complete revolutions of the disk.

If however, the operating system can say, skip three sectors and continue, then it can read or write three sectors of information on sectors one, four, and seven.

This way, reading or writing to those three sectors can be accomplished with only one revolution of the disk, or in one-third the time.

**SKREW AND DVI.** This process of skipping sectors is called skew. Almost every disk system uses some sort of skew to help information transfer faster between the computer and disk drive.

The Disk-Video Interface unit further groups nine sectors into a cluster. This cluster is the minimum amount of space a file can occupy and it's equal to 2.5K.

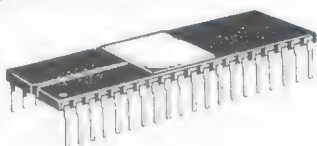
A DVI system disk has three tracks allocated to special information. Tracks zero and one are reserved for the software running the DVI and linking the 100 to the unit. Track 20 is the directory and a special area known as the file allocation table (FAT).

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**DIRECTORY.** The directory serves as a simple pointer. Maintaining the name of the file (up to nine characters), it also designates one character to indicate what type of file it is, and one character to point to the cluster that the file begins on. For some reason, file entries are done in 16-character groups leaving five characters blank for each file name. However, working in multiples of 16 characters makes an even number of file names in each half sector and simplifies the housekeeping (see figure 2).

Sectors 16, 17, and 18 of track 20 keep that special table, the File Allocation Table. And in each of these three sectors, the first 80 characters keep track of whether or not a particular cluster is in use and how. It also provides a pointer to the next cluster if a file occupies more than one cluster. All three sectors (16, 17 and 18) are identical and must all be maintained and in agreement with each other (though I don't know why).



Remember the discussion on tracks and clusters? Each track contains 18 sectors and each cluster contains nine sectors, so each track is made up of two clusters. Multiply 40 tracks by two clusters each and you come out to 80. How convenient!

**FAT.** The FAT has a particular character in each location if that cluster is "occupied." Locations 1, 2, 3, and 4 contain the value of 254 to indicate this particular cluster is used for system information. Likewise, locations 41 and 42 have the same 254 value stored there because the directory is on track 20. If the cluster is empty, the location contains 255.

For clusters used to store data for files listed in the directory, there's one of two types of information stored. If the file continues to another cluster, the next cluster number will be stored. If, however, the file resides completely within this cluster, the value will be 192 plus the last sector used (figure 3).

Okay, but how do you see all of this information? We worked out a program (listing 1) to show you the directory listing, 16 characters to a line of each and every file on your disk.

**ALMOST HOOEY.** The program doesn't stop when it encounters a blank entry, since erasing files can cause your valid file names to be somewhat scattered. If you enter it and run it, press break to end.

We then used another program (listing 2) to look at the FAT to see what it had entered. Armed with this, we then realized all this "hex-decimal" stuff the manual talked about was plain hooey. Well, not quite, but it was apparent FAT and the directory understood ASCII and we could examine the values of it by converting the character stored there to its ASCII value. How the table and directory worked then made sense.

**BACK TO JOE.** Now, let me show you how we fixed up Joe's disk to let him have his data base resident with other programs. Take a look at listing 3 for the program we used. It establishes CHECKS.DAT as a data file and reserves tracks 21 to 40 for it. Joe knows he's going to have to rework his data base programs to limit access to just these tracks, but he feels the effort will be well worth it. I wonder what he'll come up with. ◀

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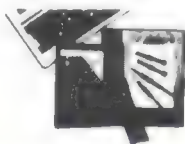
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*Program Listing 1. Listing Directory Structure.*

```

10 ' LIST DIRECTORY STRUCTURE ON
    DRIVE 1
20 ' MARCH 25, 1984
30 '   BY BILL WALTERS AND JOE
    EXAMPLE
40 '
50 N=1
    : M=0
60 PRINT "Tk Half Entry Name
    Type Cluster"
70 FOR L=0 TO 7
80 AS=MID$(DSKIS$(1,20,N,M),1+16*L,
    16)
90 PRINT N;TAB(5);M;TAB(10);L;
    TAB(16);LEFT$(AS,9);TAB(27);
    ASC(MID$(AS,10,1));TAB(34);
    ASC(MID$(AS,11,1))
100 NEXT L
110 IF M=0 THEN M=1
    : GOTO 60
120 M=0
    : N=N+1
    : GOTO 60
130 STOP

```

*Program Listing 2. Checking File Allocation Table.*

```

10 ' CHECK FILE ALLOCATION TABLE ON
    DRIVE 1
20 ' MARCH 25, 1984

```

```

30 ' BY BILL WALTERS AND JOE
    EXAMPLE

```

```

40 '
50 AS=DSKIS$(1,20,16,0)
60 FOR I=1 TO 20
70 PRINT (I-1)*4;";";TAB(5);
80 FOR J=1 TO 4
90 PRINT USING " ### ";ASC(MID$(AS,
    ((I-1)*4)+J,1));
100 NEXT J
110 PRINT
120 NEXT I
130 STOP

```

*Program Listing 3. Creating The Data File Area.*

```

10 ' CREATE DATA FILE AREA ON DRIVE 1
20 ' MARCH 25, 1984
30 '   BY BILL WALTERS AND JOE
    EXAMPLE
40 '
45 CLEAR 2000
50 AS="CHECKSDAT"+CHR$(0)+CHR$(42)
60 N=1
    : M=0
70 FOR L=0 TO 7
80 CS=MID$(DSKIS$(1,20,N,M),1+16*L,
    16)
90 IF LEFT$(CS,1)=CHR$(0) OR
    LEFT$(CS,1)=CHR$(255) THEN 200
    ELSE NEXT L
100 IF M=0 THEN M=1
    : GOTO 70

```

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```

110 M=0
    : N=N+1
    : GOTO 70
190 ' OK TO SET UP FILENAME HERE
200 B$=DSK1$ (1,20,N,M)
210 MID$(B$,1+16*L,16)=A$
220 DSK0$ 1,20,N,M,B$
290 ' NOW WRITE THE FILE ALLOCATION
300 FOR I=43 TO 79
310   FOR M=16 TO 18
320     B$=DSK1$ (1,20,M,0)
330     MID$(B$,I,1)=CHR$(I)
340     DSK0$ 1,20,M,0,B$
350   NEXT M
360 NEXT I
370 FOR M=16 TO 18
380   B$=DSK1$ (1,20,M,0)
390   MID$(B$,80,1)=CHR$(201)
400   DSK0$ 1,20,M,0,B$
410 NEXT M

```

TRACK 20  
SECTORS  
16,17,18

**VALUE**

255  
254  
192 + 1 to 9  
OTHER VALUES

**MEANING**

CLUSTER UNOCCUPIED  
CLUSTER USED BY SYSTEM OR FLAWED  
LAST USED SECTOR IN CLUSTER  
POINTER TOWARD NEXT SECTOR CONTAINING MORE OF THIS FILES DATA

Figure 3. File Allocation Table.

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# FUNKEY STUFF — 1

## LEARN HOW TO PROGRAM YOUR 100'S F-KEYS

One of the 100's most powerful features is its eight function keys. This series will teach you how to integrate them into your programs.

By JESSE BOB OVERHOLT

**T**he eight function keys on the Model 100 are versatile tools for making programs easy to operate. All of the built-in programs take advantage of them. Using the function keys in Basic programs of our own design, however, isn't an easy proposition.

While the manual gives a fair explanation of the syntax of function key commands, it offers no tutorial help. After a good bit of trial and error, I learned how to use the key commands to their best advantage.

**RFU.** In this series of articles I'll *show and tell* how the key commands work and how they are used in Basic programs. To illustrate these concepts I'll be offering a program I call RFU, short for RAM File Utility.

Regular cruisers of the Model 100 Special Interest Group (SIG) on the CompuServe Information Service may be familiar with the original version of this program, which is available in the SIG data base. Version 2, to be built-up in installments, is smaller, with different capabilities, and doesn't require the SUBLI B.CO file its predecessor did.

So sit back, fasten your seat belts, and pay close attention. There just might be a quiz at the end!

**DOUBLE LIFE.** Each function key has two roles to play in your 100. The first, and most obvious, shows up when you push the label key. Those legends appearing above the numbers at the bottom of the LCD are actually the first four characters of text strings corres-



ponding to function keys F1 through F8. Whenever a function key is pressed while the computer is waiting for input from the keyboard, the corresponding text string will be "input" one character at a time, just as if you were pushing the keys yourself.

This can be a great time-saver. Basic initializes the keys with common commands a programmer might find useful. F1, for example, is set up to list all of the RAM files on the screen by issuing the files command followed by enter.

Of course these keys wouldn't be nearly so useful if we had to live with the "canned" definitions provided by the ROM. Fortunately, this isn't the case.

**INSTANT OBEDIENCE.** Using a variation of the key command, we can define each of the function keys to say or do anything we want when it's pressed. The general form of this command is:

KEY n,string

where n is a number from 1 to 8, and string is a string expression that specifies the key definition. Let's look at an example. Try this:

KEY 1,"?TIME\$"+CHR\$(13)

Go to Basic, enter this command, and push the F1 key. The time should appear each time you push F1.

Unless you don't own a clock, this isn't very entertaining so let's analyze the command. KEY 1 indicates to the computer we're defining function key F1. Next we have a string beginning with a "?". As you know, the "?" is recognized by Basic as an abbreviation for the word print. Next we have TIME\$, which is the Basic function that returns the current time as a string. Finally we have CHR\$(13), the only way to specify the enter key as a part of the string.

**KEYSTROKE POWER.** That's about all there is to creating your own key definitions. A definition can be erased by defining it to an empty string, for example, KEY 1," ". You can specify up to 255 characters in the definition string, but only the first 15 will be used. Furthermore, only the first four will be displayed at the bottom of the screen when the label line is shown.

If you want to see the full definition, use KEY LIST, which will list the eight definitions in two columns on the display. Now it's quiz time! Go to the keyboard and change the F1 definition back to what it was before. If you don't know what it was before, then change it to perform the files command.

Now you have seen one variation of the key command. Let us move on to a more complicated form.

**INTERRUPTIONS.** At first glance ON KEY GOSUB looks pretty simple. You push a function key and *shazam!*, you wind up in a subroutine. Being able to alter the flow of a program with a single keystroke is an impressive feature, but there are a few complications.

When ON KEY GOSUB has been used the function keys become sources of interrupts. Interrupts are a complex subject, not within the scope of this article, but we can gain some understanding by studying how Basic handles ON KEY. (Editor's Note: For an explanation of how interrupts work, see *Jake Commander's* columns in the March, April, and May issues of Portable 100.)

Everytime a program is running, the keyboard is checked. If a function key has been pressed it further checks to see if an ON KEY GOSUB has been set up for that key. Finding one has, it goes



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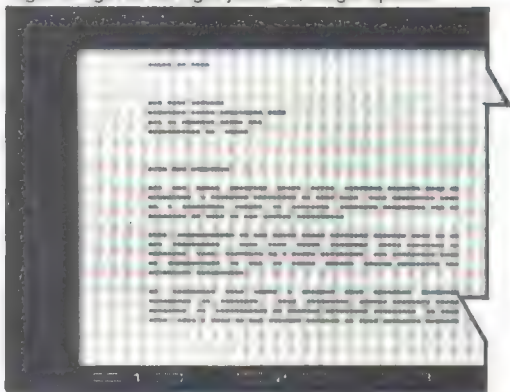
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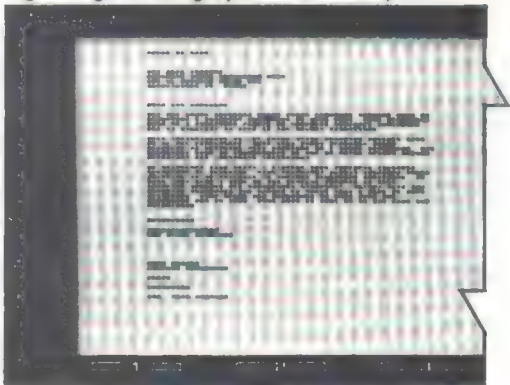
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to the appropriate subroutine. Normal program flow is interrupted, hence the term interrupt. The effect is exactly the same as if you had used the edit command to insert a GOSUB at that point in the program.

**THE KEY.** The programmer may not want to allow the flow of the program to change arbitrarily. KEY ON, KEY OFF, and KEY STOP can be used to control this. Whenever a program is run, keyboard interrupts can't occur until ON KEY GOSUB has been executed. Even then nothing can happen until function key interrupts have been turned on.

Individual keys are turned on using key, followed by the key number in parenthesis, and on. For example, KEY (5) ON would allow interrupts from the F5 key. Using KEY ON without a key number will turn on all of the function keys. Likewise keys can be turned off with KEY OFF, or KEY (n) OFF for individual control.

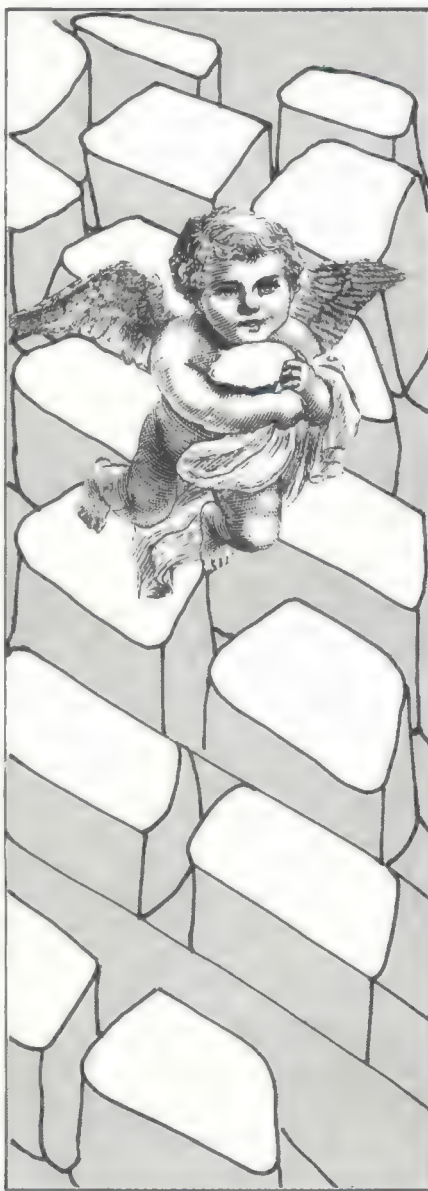
You may also use KEY STOP or KEY (n) STOP. Stop and off both work to prevent on-key interrupts. When off has been used all function-key presses are simply ignored. With stop, however, any push of a function key is remembered and the ON KEY GOSUB will take place as soon as a KEY ON occurs. Simply stated, KEY OFF disables the function keys while KEY STOP delays them.

**GET KEYED-UP.** Assignment of subroutines to function keys is done with the ON KEY GOSUB statement. Subroutine line numbers must follow the GOSUB and correspond directly to the function key numbers. It isn't necessary to assign subroutines to all the function keys. ON KEY GOSUB 10,20,30,40,50,60,70,80 will assign line 10 to F1, line 20 to F2, and so on. By using ON KEY GOSUB 100, only F1 is assigned to line 100. Likewise, ON KEY GOSUB 100,,300,,500 assigns F1 to 100, F3 to 300, and F5 to 500. All others remain unassigned.

Whew! It's been rough, but we've made it through the muck and mire and now know everything there is to know about function keys, right? Wrong! There's one minor thing that needs to be discussed. Since the function keys can be used in two ways, how does Basic know which one to use when it's pushed? Good question.

**PITFALLS.** If the ON KEY GOSUB statement hasn't been executed, then the function keys work in their character entry capacity. Even if ON KEY GOSUB has been done each function key will continue to work this way until it has been turned on by a KEY ON statement. Sure it's complicated, but wait, there's more!

If a function key is pushed during the execution of an INPUT or INPUT\$ from the keyboard it will *always* perform its character entry function. You simply can't activate an on-key KEY subroutine while in the middle of input from the keyboard. This isn't true, however, of INKEY\$. Pushing function keys while scanning with INKEY\$ will cause character entry only if the pushed function key is off. Otherwise you'll perform the ON KEY GOSUB.



Another difficulty in the use of ON KEY GOSUB is the nesting of function key interrupts. In a fit of fiendish glee, the operator could proceed to push all remaining function keys, sending the program scurrying hither and yon. This mad scramble can create a logic flow you never anticipated. The only apparent rule that Basic follows in the nesting of interrupts is it won't allow the same function key interrupt to occur twice in succession. Thus if F1 is pushed, and the ON KEY GOSUB is taken, a second push of F1 will be remembered, but will have no effect until a return is made from the F1 routine.

**HOW TO COPE.** Because the timing of key presses will never be exactly the same in each run of the program, you may wind up with bugs which appear seemingly at random, but can't be duplicated.

Coping with this madness isn't difficult if you give a little thought to the design of your program. Rarely, if ever, will it be advantageous to allow nesting of interrupts. Therefore the first statement in your ON KEY GOSUB routine should be KEY OFF. This simple precaution will prevent unscheduled "surprises" from ruining your best-laid plans.

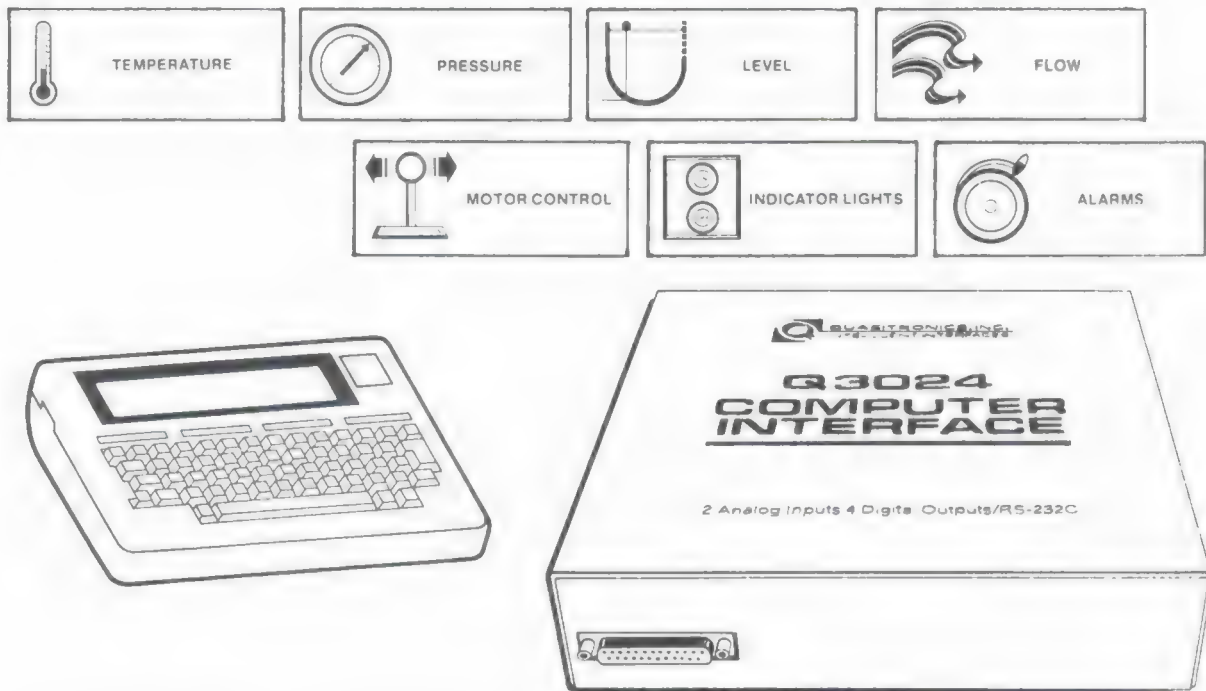
**THE LISTING.** Now let's turn our attention to the initial portion of RFU, program listing 1. (I urge you to key this program into your MEWS, but I must warn you it'll be revised slightly in the next article in this series.) Lines 100 to 190 of this program perform initialization.

Note in particular the use of ON GOSUB in line 190. My idea with this program was to display a menu, similar to that provided by the 100, with a cursor that can be positioned over any file name. Once the cursor has been used to "select" a file, you push F1 through F7 to perform various functions on the chosen file.

Lines 200 to 230 also serve an initialization function. In line 210 the RAM file directory is read into array FL\$ and variable NF is set to contain the number of RAM files found. All this is accomplished by a GOSUB 52000. The subroutine at 52000 is a classic crude-but-effective method of getting the names of the RAM files. It does this by simply displaying the directory and then PEEKing the names out of display RAM. A major disadvantage of this



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PS: You won't be happy with this complex program if your machine has less than 24K. But, we intend to produce a ROM version soon! Watch this space, but don't hold your breath — full trade-in on the cassette version will be given. By the way, you can change the name of the program once it's loaded if you don't like it!

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method is we don't have access to any of the other information in the RAM file directory. In part 2 we will replace subroutine 52000 with one having more capability.

**SCANNER.** Line 220 displays the directory using the subroutine at line 51000.

It's necessary for RFU to do this itself instead of using FILES, in order to have control over its cursor. Variable IX contains the number of the file (in array FL\$) the cursor is positioned over. Finally, in line 230, the selected file is highlighted by calling 52000. Variable X\$ is set to the code for Reverse Video display, causing the cursor to be turned on.

Lines 300 to 820 are the heart of RFU. As previously stated, this program uses the function keys in conjunction with ON KEY GOSUB. Whatever KEY definitions may have been set-up are left unchanged.

However it also is necessary to scan the keyboard for the arrow keys in order to move the cursor from one file to another. This scan takes place in line 310, which also continuously displays the date and time. Note the use of INKEY\$, which is the only form of keyboard input that'll allow ON KEY GOSUB to work correctly while performing keyboard input.

**CURSOR CONTROL.** Characters for this operation are checked in line 320. Variable CC\$ contains the ASCII values of the four arrow keys and the enter key. The arrow keys are handled by subroutines 400, 500, 600, and 700 for left, right, up, and down respectively. Notice the KEY OFF in line 320. This is necessary to prevent a function key interrupt from occurring while the cursor is in "limbo" during the processing of an arrow key.

The enter key is handled by subroutine 800. RFU treats the enter key in the same way as the standard Model 100 menu. Basic files are run, while document files are loaded into TEXT for processing.

No, there's no command for going from Basic to TEXT. So how does RFU do that? Well, you'll note the 100 menu display will also accept the entry of a file name from the keyboard as an alternative to the usual "select and push enter" method. If we had a way to simulate entry of commands through the keyboard, this method would work well.



**FLYING FINGERS.** To keep up with speedy operators, the 100 has a keyboard buffer capable of holding 32 characters. If we could plug this buffer with our own key values, the 100 would react as if they'd been typed.

The subroutine at 53000 performs this function. Variable X\$ contains the commands to be performed, with CHR\$ (13) used wherever enter is required. POKE is used to load the buffer.

Note that each key takes two bytes of buffer space. The first is the actual key value, while the second is a code. A code value of 0 indicates a "normal" key, while 255 indicates the key is a function key. With this technique only one byte of buffer space is used by a function-key press, instead of one for each character for which the function key is defined.

**POETRY IN MOTION.** Getting back to the initial problem of passing a file name to TEXT from Basic, we look at line 810. X\$ is set to contain a MENU, followed by enter, the name of the file, and a final enter. Once this string has been loaded into the key buffer by 53000, a simple end-statement plus everything in motion.

You can use subroutine 53000 in programs of your own design, if some precautions are followed. Make sure that X\$ is never longer than 32 characters. Failure to heed this could cause a file system crash. Also be advised that some programs empty the keyboard buffer before beginning. TEXT is one of these, so you can't load the buffer with TEXT commands and expect them to be executed after the file has been loaded.

Finally, we have the function key service routines in RFU. These are the subroutines that perform the functions assigned to the various function keys. In this version all of them have been set to do nothing with one exception. Only F8 is assigned to its conventional MENU function.

**COMING UP.** In future installments we will build-up routines, as well as describe how to insert routines of your own design.

You've made it to the end of lesson 1. In the next installment I'll replace the directory-read routine at 50000 with one having more capabilities. I'll also begin building some of the function key service routines. Don't be late! Class dismissed. ◀

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## **FUNKEY STUFF**

```

1 'RFU by Jesse Bob Overholt
2 'Version 2.00
100 'Initialization
110 CLEAR 800
    : MAX FILES =2
    : DEFINT A-Z
120 DIM FL$(25)
130 ES$=CHR$(27)
    : RV$=ES$+"p"
    : NV$=ES$+"q"
    : CL$=ES$+"K"
    : CF$=ES$+"J"
140 CG$=CHR$(29)+CHR$(28)+CH
    R$(30)+CHR$(31)+CHR$(13)
190 ON KEY GOSUB 1000,2000,3000,4000,
    5000,6000,7000,8000
200 'Read directory & display it
210 GOSUB 50000
220 GOSUB 51000
    : IX=1
230 X$=RV$
    : GOSUB 52000
300 'Select file & get function
310 PRINT @0,DATE$;" ";DAY$;" ";
    TIME$;
    : KEY ON
    : X$=INKEY$
    : IF X$="" THEN 310
320 CC=INSTR(CC$,X$)
    : IF CC=0 THEN 310
    ELSE KEY OFF
    : X$=NV$
    : GOSUB 52000
330 PRINT @240,CL$;
    : ON CCGOSUB 400,500,600,700,800
340 X$=RV$
    : GOSUB 52000
    : GOTO 300
400 'Cursor left
410 IF IX>1 THEN IX=IX-1
    ELSE IX=NF
420 RETURN
500 'Cursor right
510 IF IX<NF THEN IX=IX+1
    ELSE IX=1
520 RETURN
600 'Cursor up
610 IF IX>4 THEN IX=IX-4
620 RETURN
700 'Cursor down
710 IF (IX+4)<=NF THEN IX=IX+4
720 RETURN
800 IF RIGHT$(FL$(IX),2)="BA" THEN
    RUN FL$(IX)
810 IF RIGHT$(FL$(IX),2)="DO" THEN X$=
    "Menu"+CHR$(13)+FL$(IX)+CHR$(13)
    : GOSUB 53000
    : CLS
    : END
820 RETURN
1000 'F1 Service Routine
1010 RETURN
2000 'F2 Service Routine

```



# FUNKEY STUFF

```

2010 RETURN
3000 'F3 Service Routine
3010 RETURN
4000 'F4 Service Routine
4010 RETURN
5000 'F5 Service Routine
5010 RETURN
6000 'F6 Service Routine
6010 RETURN
7000 'F7 Service Routine
7010 RETURN
8000 'F8 - Menu
8010 MENU
50000 'Read RAM Directory
50010 CLS
      : FILES
      : AD!=65024
      : NF=0
50020 FOR IX=1 TO 25
      : IF PEEK(AD!)=32 THEN IX=25
      : GOTO 50090
50030 X$=""
      : FOR I=0 TO 5
      : X$=X$+CHR$(PEEK(AD!+I))
      : NEXT I
50040 IF RIGHT$(X$,1)="-." THEN X$=
      LEFT$(X$,LEN(X$)-1)
      : GOTO 50040
50050 X$=X$+"."+CHR$(PEEK(AD!+
      7))+CHR$(PEEK(AD!+8))
50060 FL$(IX)=X$
      : NF=NF+1
50070 AD!=AD!+12
      : IF (IX MOD 3)=0 THEN AD!=AD!+4
50090 NEXT IX
      : RETURN
51000 'Display directory
51010 CLS
      : PRINT DATE$;";";DAY$;";";
      TIME$;";";
51040 L=1
      : FOR I=1 TO NF
      : PRINT @L+40,FL$(I);
      : L=L+10
      : NEXT I
51050 SCREEN 0,0
      : PRINT @280," Menu";
51060 RETURN
52000 'Highlight selected file
52010 FL$="-"+FL$(IX)+SPACE$(9
      -LEN(FL$(IX)))
52020 PRINT @((IX-1)*10+40,X$;FL$;NV$;
52030 RETURN
53000 'Keyboard simulation subroutine
53001 ' Input: X$ contains keyboard
53002 ' entries to be simulated.
53010 X$=LEFT$(X$,32)
      : FOR I=1 TO LEN(X$)
53020 X1=(I-1)*2+65451
      : POKE X1,ASC(MID$(X$,I,1))
      : POKE X1+1,0
53030 NEXT I
      : POKE 65450,LEN(X$)
53040 RETURN

```

# TRS-80

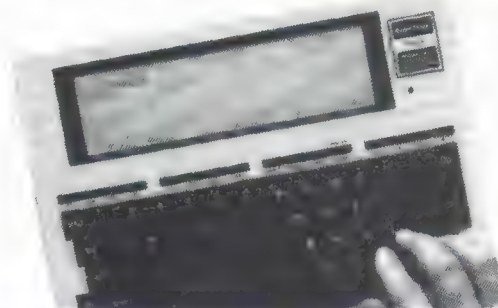
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# A 100'S ODYSSEY ON A RECUMBENT





# When this bicyclist embarked on his solo pedal across the country, his sole companion was his 100. The portable recorded some unusual impressions — and made some of its own.

By STEVEN K. ROBERTS

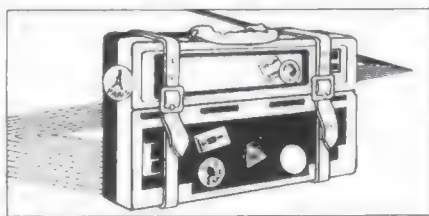
I'm an agent of future shock. This first became clear on the morning of September 29, 1983, a scant 100 miles into the journey. I glided into Christiansburg, OH (population 593) on my wondrous Winnebiko. Dismounting in front of the town's only pay phone, I uploaded a magazine article to my assistant back in Columbus.

I hunkered-down on the pavement in the autumn sunlight, zipped open the briefcase, and exposed the Model 100. Fitting the acoustic cups to the handset, I dialed CompuServe and began transmitting a file.

A dusty pickup truck rattled to a stop beside me, and after a moment there emerged an even dustier farmer. He squinted at the bike, then at me, then again at the bike. Slowly chawin' tobacco, he walked around the machine and noted the tilted solar panels, the under-seat steering, the 18-speed derailleur, the drum brake, the antenna, and the liquid crystal displays in front of the seat. He peered at me as I sat there watching text scroll by — and scrunching up his face in a quizzical look, he finally spoke: "Are yew with NASA?"

**HIGH-TECH ODYSSEY.** Over 3,600 miles of pavement has passed under my wheels since that moment. At this writing, I'm nearing the end of a winter layover in Florida; as you read this, I should be approaching the West Coast and the 6,000-mile mark. The whole odyssey is expected to take the form of a 14,000-mile loop around the United States.

I've wanted to travel on this scale for years, but there has always been one



**TRAVEL**

major catch: money. My savings account would *never* support a year or two on the road, and my business — freelance writing — was too cumbersome to carry on a bicycle. Valiantly I tried, though.

In 1980 I pieced together a dual-drive CP/M system that would fit in a bicycle trailer, and then promptly tore a ligament in my right knee on a training ride. Dismayed, I bought a motor home and drove all winter at 8 mpg. Somehow it just wasn't the same.

**POSSIBLE IN '84.** But now it's 1984, and although we're still a long way from the ideal portable computer, we *do* have something quite serviceable. Right now it's clattering away in this shaded campsite, attached to a 4AH nickel-cadmium battery charged by the sun. The whole package: office, kitchen, bedroom, and vehicle, weighs-in at under 150 pounds.

Upon this human/solar-powered conveyance, I'm maintaining a vigorous, often exhausting, writing business. Technology surfaces everywhere: the Ohio farmer's response was so typical it could symbolize the entire journey. (NASA, eh? Is this a Loony Excursion Module? I once told a marine sergeant at Camp Lejeune that it was a "human-powered assault vehicle," but that's a

different story...)

The technologies serve purposes other than making jaws drop. Let's look at the whole package then consider the information flow rendering the business practical and profitable.

**OFFICE ON WHEELS.** The bicycle is a *recumbent*, offering considerably more comfort and efficiency than old-fashioned bicycles. It's difficult to fit into hotel elevators and sailboat cabins, of course, but for those long hours on the highway, it can't be beat. The handlebars are under the seat, and my entire body — except for a pair of energetically pumping legs — is relaxed. I can climb hills more effectively, since there is something solid for me to push back against, and stability is greater than it would appear at first glance.

The net effect is a delightful sense of comfort that I've never experienced on a traditional bicycle, along with a brisk ride that has so far hit 44 mph — with a bit of gravity assistance (I manage 10 mph on the other side of the same mountain).

Added to this is the touring gear — on the heavy side, perhaps, but quite well-suited to the application. The tent is a "3-man dome" (the three would have to be *very* good friends), and all camping and cooking equipment is standard state-of-the-art stuff from stores with woodsy-sounding names.

**ATYPICAL.** But here we diverge from the norm. The white bag on the bow contains the Saft-made battery pack along with charge-monitoring circuitry and voltage regulators for the accessories. It also houses a CB radio for emergencies. (It's culturally useless, but



# Radio Shack's TRS-80 Now Offers Disk S

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ideal for calling for help or berating aggressive truckers. I did that once outside of Jacksonville after a narrow brush with death, and the driver's response to my not-entirely-polite harangue was: "You got a CB on that thing?"

Anyway, the white bag also houses a security system that beeps me via a pocket pager when vibration sensors detect tampering. More than once I've dashed out of a restaurant with pasta in my beard to apprehend the thief, only to find a curious tourist wiggling the handlebars: "Look! Here's how he steers it!"

The battery pack's biggest load, however, is the lighting system. Controlled by a switch panel under the seat are a sealed-beam halogen headlight, an automotive taillight, a yellow highway barricade flasher, and a xenon strobe atop the flagpole. At night, the bike suggests either an emergency-in-progress or a carnival, depending on your frame of mind. In either case, drivers carefully avoid me. In camp, I can plug

in a small fluorescent light when the friendly flickering candle is insufficient for work.

**SOLAR POWER.** The battery is charged by a solar panel — a Solarex semicrystalline unit that has so far withstood physical abuse including rain, intense sun, extended vibration, and freezing. Mounted on a ball-and-socket tripod mechanism, the panels can be manually tilted to face the sun — or set horizontally to make a tabletop for occasional fast-food stops.

Inevitably, there are extended cloudy periods when the panels only serve up a trickle instead of their customary 300-odd milliamps, and I can avoid being rendered powerless at these times by pulling out a small charger and plugging it into the nearest wall. But normal system use is fully supported by the sun.

Other electronic accessories include: camera, stereo tape recorder, FM re-

ceiver, and Model 100. An octogenarian at a campground once quavered, "Looks like the only thing you forgot is a grandfather clock." By coincidence, I had just downloaded a grandfather clock simulator from CIS's Model 100 SIG. With a flourish, I whipped out the computer and fired up the program, leaving my aged friend shaking his head speechlessly.

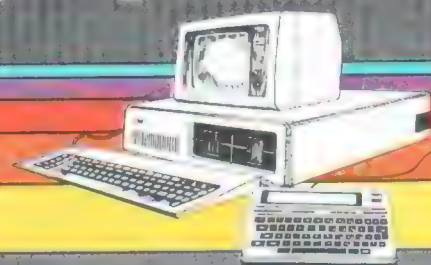
**NOT WHILE DRIVING.** It never fails to astound me when someone asks, upon being shown the 100, "So, uh, do you type while you're riding?"

No, the computer is strictly for camps and houses and beaches and anywhere *except* the highway. It obviously needs no introduction in this magazine, and I suppose it's use is typical but for the environment in which it finds itself. I spend most of my time in TEXT, with TELCOM handling the file transmissions back to Ohio and other network activities.



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**NETWORK KEY.** The 32K of memory doesn't go very far when my fingers start flying in earnest, and some external file storage is essential. So are daily business communication, manuscript transmission, mail, and more. For all this, I use a half-dozen CompuServe accounts, each with a different purpose. A key part of the daily routine is a phone stop to access the closest node and check in with my office in Ohio.

I mentioned my assistant — a critically important part of this venture. As exquisite as the technology may be, it can't handle the telephone, intelligently edit text, perform the "accounts-payable shuffle," or present the illusion of stability when necessary. This is where Kacy, my interface with the universe, fits in.

My old office, you see, was extracted from the 3-bedroom ranch in suburbia (anybody wanna buy a house?) and installed in Kacy's basement. All those traditional trappings of business — file cabinets, photocopier, word processor, books, and overflowing In and In-Deeper baskets — are still a part of all this. I don't have to be surrounded by them any more: Kacy does. In return for this, she receives a percentage of my gross income, insuring that we share the same motivations.

The net effect, when everything is put to work, is a surprisingly efficient and trouble-free method of doing business on the road. Despite the occasional frustrations of no-node towns and Tymnet, the communications channels are effective and liberating.

**FILE STORAGE.** As was inevitable, this experience is turning into a couple of books. One, *Computing Across America*, is about the adventure itself; the other, *Breaking the Chains*, is a how-to book dealing with doing business on the road. Book manuscripts are large, clumsy, rather awesome things, weighing 5 to 10 pounds or more. This is a problem, for writing a book involves more than just dashing off chapters as if they were articles. By the time I hit chapter 10, chapter 1 is dog-eared and covered with revisions.

So I'm adding what must be the ultimate bicycle accessory: a CP/M disk system. Physically about the same size as the 100, this unit from Micromax (Columbus, OH) includes a pair of 3.5-inch floppies and a 64K processor whose job is essentially limited to file support. The 100 is still the editing machine —



the workstation — but it now has a disk on the other end of its RS232 port. Sure beats audio cassettes!

**NOMADIC SOCIAL LIFE.** Traditionally, the life of a solo wanderer wasn't one for a flagrant extrovert, but that's changed, too. This system is an infallible conversation piece. It solves the problem of drifting through a town in quiet anonymity.

And then there is the 100, with all that it implies: CompuServe CB, EMAIL, and bulletin boards. Node cities are chances to keep a whole network of friendships alive — and since I publish an ongoing account of my journey, both on line and in print, there are always invitations awaiting me when I check the old electronic mailbox.

The combined effect of all this is a sense of stability, of community — not a small consideration when your closest non-electronic friend is hundreds of miles away. It's pleasing to put to such use a technology that many feared would have the opposite effect.

**EXTENDING THE IDEA.** The system of hardware, files, people, and techniques that has evolved to support this venture turns out to have some interesting implications. It's clearly useful for anyone in a full-time traveling mode, but extends well to others.

Consider, for example, the typical marketing executive. Frequently on the road for trade shows and visits to clients, this person probably suffers all the classic pains of business travel: being out of touch with the office, handling money, playing telephone tag, and losing the cohesiveness of the subordinates back home (while the cat's away...). But with a portable computer, network access, and a stable assistant, a wandering-exec can be nearly as effective as he was before hitting the road.

The specific methods depend upon the kind of business. In my case, Kacy and I regularly exchange status messages and updates through a simplified electronic mail: since we are the only correspondents within that account, we just label the message files STEVE or KACY, depending on whom they are for. The disappearance of a file serves as acknowledgment of its receipt, and if one is still there when we want to add another, we just call the new one STEVE2 or whatever.

This works pretty well for day-to-day

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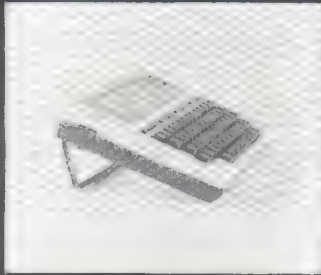
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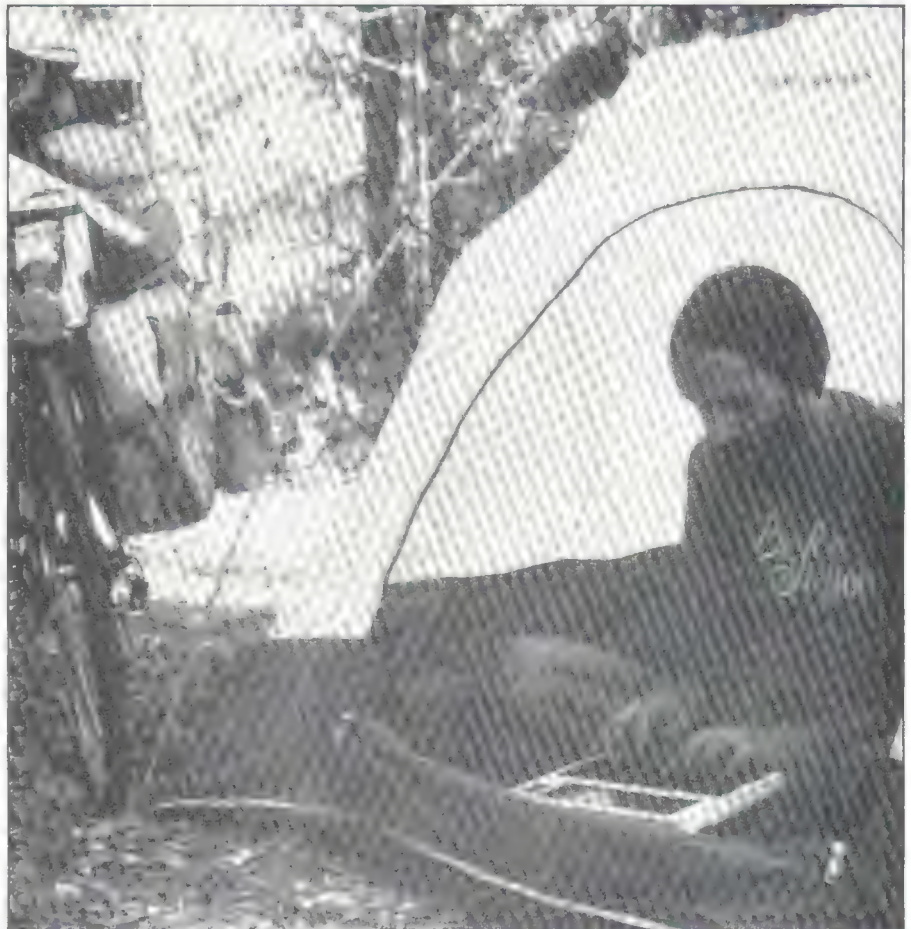
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## ODYSSEY



interaction, but lists of things to do can get lost that way. The solution is simple: a file called DO to which I add new items as necessary ("send a copy of the *Online Today* AI story to Ed Feigenbaum"). She flags these with either the word "done" or other commentary, and I periodically go through the file and clean out old tasks.

But the meat of the business is writing — and the generated text in the Model 100 is moved into a CompuServe work area as soon as I'm ready for Kacy to edit it and send it off to the publisher, or when I run out of space.

**BREAK TRADITION.** The system also includes a data-base-management system to handle a file of people who have offered accommodations, recipes (believe it or not), and storage of downloaded Dialog sessions and other research material. The point here is that such a system, based on a roving portable, a network, and a stable assistant, is applicable to almost any information-oriented business. The technology that has been developing for decades is in place and working well enough to have

some of those long-promised liberating effects.

Oh, there are improvements that could be made. The 300 baud is an endless nuisance, some nodes are flaky, and there are still too many nodeless burgs — quaint backwaters of the information age. Switches can fail, and screens are too small. There's never enough memory, of course, and a few million more modular phone jacks would let us discard bulky and sensitive acoustic couplers once and for all.

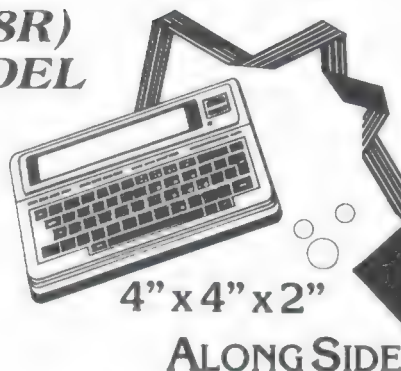
But all that notwithstanding, it's reasonably easy to take a business on the road — breaking the chains that have traditionally bound us to our desks. And if that's not what it's all about, then what is? ◀

*Steve Roberts is the author of numerous articles on computer-related subjects, as well as three books including, *Creative Design with Microcomputers* and *The Complete Guide to Microsystem Management* (both Prentice-Hall, 1984). He lives full-time on the road and can be reached via CompuServe user ID 70007,362. He also appears now and then on CB simulator as "Wordy."*

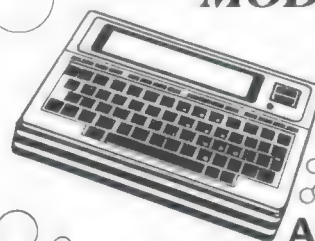


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## MODEL 100 128K BUBBLE MEMORY MODULE

Soundsight is proud to announce its new 128K bubble memory module for the Model 100! The module is available in two models, allowing it to be either attached to the bottom of the Model 100, increasing its overall thickness by approximately half an inch (Model 128X), or set up remotely, along side the 100 in a small package approximately 4" x 4" x 2", requiring the use of a cable (Model 128R). Both AC and DC operation is provided, requiring only a small 12 volt adapter. Rechargeable batteries are also compatible. The memory will be expandable to one megabyte (one million bytes of memory) through the purchase of additional modules, requiring factory installation (Model 128X), or reconfiguration (Model 128R).

This bubble memory module has a non-volatile memory which means the memory will not be lost in the event of loss of power

or dead batteries. It can operate like a hard disk in which vast amounts of data or programs may be quickly stored, downloaded, and then run in the Model 100's 32k RAM. Upon downloading to RAM, the data is not erased from the bubble memory. With the use of simple sub-routines, programs which exceed the Model 100's RAM may be made to operate by sampling between the 100 and the bubble. No more I/O errors or cassettes or disks that won't read, and no more address or note files which take up the majority of RAM preventing the storage of other programs and requiring tedious cassette or disk procedures.

Power consumption is low because the bubble memory is powered up only when it "reads" or "writes" and it performs these functions in less than a second.

Originally developed by Soundsight for

Stevie Wonder's Model 100, this module is especially useful to reporters, programmers needing remote terminals, or anyone finding that they need more memory in order to take full advantage of their investment in the Model 100 and all the software they may have bought but cannot use due to lack of memory.

The two models differ in price and features. The Model 128R sells for \$750.00, while the bottom attachment — Model 128X, sells for \$950.00. The 128X series allows space for the interfacing of additional 128k memory modules and their power requirements.

As certain programming is necessary for operation of the bubble memory module with the Model 100, the software driver sells for \$100.00.

To order, send check or money order payable to Soundsight Communications.

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# HOW THE NETWORK NATION CHANGED AN EXECUTIVE'S LIFE

Caution! Reading this may change your life. It certainly changed Mike Greenly's.

By MIKE GREENLY

Six months ago, I had what my parents called *everything* — I had made it in the Big Apple. I was the vice president and resident (aging) wunderkind of Avon Products Inc., the world's largest beauty company.

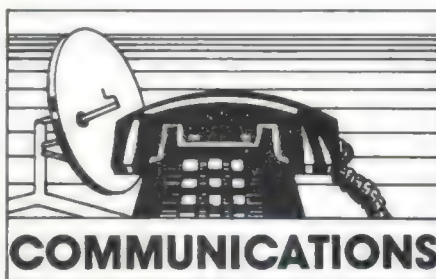
I was told when I joined Avon that it's so big, it's careful when it buys from the talc mines — lest it inadvertently drive up the world price of powder! And that's where I was; a marketing madman.

The local Avon representative in Beaufort, SC, would hear news of "Mr. Greenly in New York," about a speech he had given, or a product launch he had worked on. My parents (since I wasn't going to marry, or create grandchildren) were happy by the glories of "our son, the 35th floor executive." My mother used to ship cookies to Avon's president, just in case it might help.

**A NEW START.** But that's all over now. I quit. And it was telecommunications that helped to end those proud days for my folks. Participate was the specific system that pushed me to reshape my life. I'll tell you about it, but be careful ... the same thing could happen to you!

Ironically, it was Avon that opened the door. I was helping to form their first Technology Task Force — a group of us were to lead the corporation into 80's and 90's technology.

My main work at the time involved the creation and marketing of 200 new products a year. On an extracurricular basis, though, I was to learn about technology.



Back then, VisiCalc and VisiPlot were too much of a pain to master. Why spend two hours entering data and going through various DIF com-

## GETTING STARTED

**Y**our Model 100 manual (page 85) tells you how to use the F3 key to reset the telecommunications protocol so your machine can talk to various data bases. Following those instructions, here is what you type to set up for The Source:

M (for 300 baud)  
7 (for 7-bit word length)  
I (for Ignore parity)  
1 (for 1 stop bit)  
E (for Enable XON)  
,10 (for pulse rate)

As a result, when you enter TELCOM, the top line on your 100 should say: M7I1E,10 pps. ◀

mands to produce one scraggly graph I could remember in my head? Forget it. The future could either wait or get easier.

**LOVE AT FIRST BYTE.** But then I discovered The Source, the telecommunications system owned by *Reader's Digest*.

My father used to keep *Reader's Digest* with the toilet paper: two utter necessities. I always was impressed by his loyalty to a magazine that to me seemed hopelessly out of it. Those people condensed books like soup.

So I was pretty surprised to discover The Source, the electronic publishing and data-base system, was created by those same folksy people. And even more surprised at how quickly I became an addict.

Oh, sure, just as with VisiCalc, depression stalked the pathway of knowledge. There were times when I was sure I should go back to lipstick immediately — back to jewelry and collectible porcelains — just be done with this (censored) computer nonsense. But I persisted. Avon, after all, was counting on me to become knowledgeable.

**TETE-A-TETE.** The Source has a Help Line I haunted — 1-800-336-3330. Unfortunately it's not 24-hour help (it should be). But there's also information on line for The Source users who get stuck. (You type: Help Mail, for example, to learn to send and receive Source Mail.)

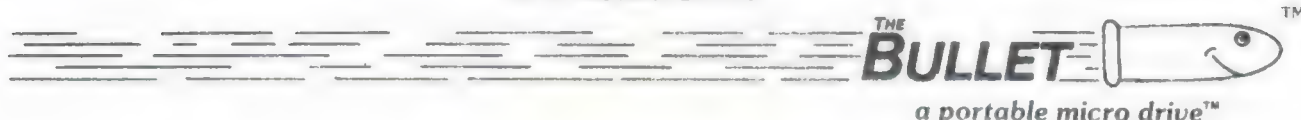
As I got more skilled, I discovered the wonder of talking with someone unseen, my words and his or hers glowing on the screen in front of me. It was fun chatting with a 13-year-old in Iowa who knew more about computers than I ever could, or with the retired car salesman in Vancouver, Canada, or with the hot-chat person who kept steering the conversation to specifics.

It was exciting to meet people who were causing technological growth. For example: One early morning I met a smart and clever man, Steve Gibson, the inventor of the Gibson Light Pen and President of Gibson Labs. I was shocked and pleased that I — Mr. Low-Tech — could interact so easily with someone like Steve.

**GLOBAL BULL SESSION.** Then I discovered Participate (which Steve uses



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also). Participate on The Source, Parti, goes far beyond a chat or exchanged mail. It's a new and extremely powerful form of interactive communication. It was Parti, more than any other piece of technology, that simply and accurately changed my life.

Parti lets people — individuals and whole groups of people — talk to others about common topics of interest. It's like an electronic conference room, with the topic of discussion on the outside of the door: Enter if you want to discuss "X".

Inside, people talk one at a time — no interruptions; you never miss a word. They participate wherever and whenever they feel like it. Every comment is stored in the exact order in which it was made. You can watch idea build idea. If you've joined the meeting late, you can go back and read exactly what's been said, you always can get up to date. And ideas (separate sub-conferences) can branch off the main ones for those who want to pursue them.

People from Tampa to Tel Aviv, from London to Lubbock, all talk to each other without being on line at the same real moment in time. They talk about all kinds of topics: Pascal (the computing language I used to think referred to the philosopher), football or politics, families and computing. They talk about the NAPLPS protocol for transmission of graphics to your monitor, about women's issues, gay rights, architects, medicine, Unix—you name it!

**DELICIOUS MENU.** I was the first on my block several years ago to learn about cellular radio. And I learned it from the president of a major radio corporation. An opportunity for mind expansion, for me it was a major turn-on.

## GETTING DOWN TO PARTI

**W**hen you're on The Source, at the command level (arrow prompt), if you remember to say, Chat-Off, you'll stop yourself from being interrupted by someone wanting to chat with you while you're learning to use Parti.

Type at command level: Parti.  
You'll then receive a menu which, as this article is being written, looks like this:

```
Participate on the Source
1. Overview
2. Instructions
3. List principal Conferences
4. Begin to Participate
Choose One (or Quit)
```

You can do without the Overview and, move right into instructions. Type 2 and hit enter.

Keep pencil and paper handy to make notes as you go. To stop the screen from scrolling so you can study something more slowly, press control-s. To resume the scroll of text, press control-q.

After you've read the instructions, choose option 4. You'll then see: 2 Waiting notes. Read, Scan, Other.

The two major commands you use when you encounter mail are:

- Read, to read the entire piece of mail; and
- Scan, to get the top lines only for a quick flavor of the letter.

If you scan a letter and like what you see, then you can "read" it.

The two waiting notes are in every newcomer's mail box. Since you're just starting out, type read.

The first piece of mail is an invitation to join the "Parti" Conference (conference titles are always in quotes). "Parti" is where everyone sends public invitations to join their conferences.

If you join this conference, you'll receive future invitations to all kinds of public conferences. You'll be able to accept or reject those invitations as you wish. To join "Parti", type join and press enter.

You have just read your first piece of mail, but you can't go on to the next letter until you dispose of this one. You'll see a prompt asking you for disposition of the mail you've just read. Type d (for delete) and press enter. Then type next and press enter.

Letter number two is the "Practice" conference. This is highly recommended! It may take 45 minutes or more, but it'll prepare you so you'll get enormous value from Participate.

Spend the time now. Your participation — and your pleasure — will be at a much higher level as a result.

If, as you're learning Parti, you want additional help, send a message to Helper. Helpers are volunteers who check Parti mail frequently to assist newcomers. (You'll learn how to send a message to Helper from the "Practice" conference.)

The above instructions are only a beginning. Participate is an extremely powerful communications tool, and there are many options not covered in this article. But with this initial data and a subscription to The Source (call 1-800-336-3330), you should be able to get started with relative ease. ◀

Some more examples:

- "Dear Mama," an electronic advice column.
- An editor of *New Shelter* magazine invites people to submit their houses for the magazine's "Home of the Month" column.
- The educational TV show, *New Tech Times* interacts on Parti to explore a

new mix of electronic print with video.

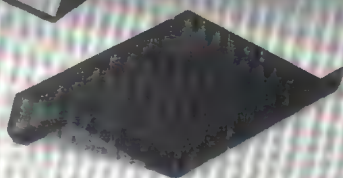
- Our Model 100 has its own conference too. Alan Steinberger loved his machine so much that he started one called "M100".

It was popular overnight.

**JEKYL AND HYDE.** You can easily have multiple identities on Parti — Mr.

## PORTABLE COMPUTER DESK TOP STAND

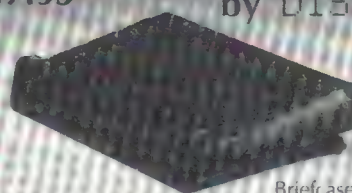
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## FREQUENT PARTI COMMANDS

**T**here are three major prompts in Parti: disposition, action, and scratchpad.

The disposition prompt asks you to dispose of a piece of electronic mail before going on to something else.

From the action prompt you're free to act in any direction like retrieve letters to read, initiate mail, answer a conference.

In scratchpad, you'll prepare or upload your messages for Parti. Scratchpad commands start a line and are preceded by a period. If you need on-line help in scratchpad, you can precede the period with a question mark. A message will display an explanation of the message command.

Here are some commands you'll use frequently with these prompts.

## Disposition Commands

**Scan.** This will give you the first few lines of the mail. You then can decide if you want to read it or not.

**Read.** Lets you read a letter in its entirety.

**Join.** This lets you become a member of a conference and automatically sends you mail sent by other participants.

**Leave.** This command lets you leave a conference. You'll no longer receive mail addressed to you.

**Write.** This lets you answer the particular piece of mail you're holding in your electronic hand. The command takes you to scratchpad to compose your reply.

**Next.** If you don't want to bother with the present letter, this lets you move on to the next. You can retrieve it later if you want to.

**Stop.** This enables you to set this letter aside, but not move on to the next one. It takes you to the action prompt immediately.

**Cancel.** To set this letter aside and cancel all the remaining ones, this command empties your inbox. You then can use Read Since to read only recent mail.

## Action Commands

**Read Waiting.** This asks Parti to tell you how many notes are waiting in your inbox. You'll then read or scan any mail.

**Read Since.** This lets you retrieve from Parti any mail you've received since a particular date.

**Scan "XXX".** This allows you to scan or read a particular conference opener. Conference titles are always in quotes.

## Scratchpad Commands

**.Answer.** The most common form of mail sent. Use this to send answers to conferences or to send private messages. An answer to a conference can be read by everyone joining the conference.

**.Message.** Use this when there's no existing document to answer; you are initiating the message. Normally, you don't use this command when writing to a conference because any reply to a message will be read only by you.

**.Conference.** This is the way your text becomes an opening invitation to other readers to join a conference you're initiating.

**.Display.** This shows what you've written so far in your scratchpad.

**.Clear.** This clears your scratchpad. ◀

**RELIGIOUS EXPERIENCE.** It was on this medium — irritating though it was to learn — that I toughed it out and grew. I soon began meeting people all over the world. The sharing with them changed me. And I began to think that my own marketing talent could have a place in their universe too.

Parti, and the networking that resulted, opened my skull and poured light and knowledge inside — most especially the knowledge of how little I knew, and how much was available to learn. But also the view of a wide-open growth field.

Parti led me to want more of technology — more than I could get as an officer of a beauty company, even the world's number one. And turning 39 made me think I'd better hurry!

**GOOD-BY IVORY TOWER.** Now — just months after leaving that well-paying executive position — it still shocks me that I actually did it. Sure it was a risk. (My mother still wonders whether she should continue sending her pecan sandies to Avon's president, Jim Preston, "just in case" I made a mistake.)

But that's the power of electronic networking: Precisely because I was able to meet people involved in technology in advance, I was also able to sense I had something special to offer as a marketer. In fact, people that I met electronically two years ago are clients today.

The medium in general, and Parti in particular, can be used to create bonds to form support for a whole new future. I couldn't have been brave enough to leave Executive City if I hadn't already moved into the Network Nation. ◀

Steinberger uses his stage name, Alan Sand, for M100. But you'll also find Watusi, Crusader Rabbit, Psyche, Diane W., and David 1 bopping about on Parti. Of course I've also heard from noted communications thinkers like Harvard professor and author Daniel Bell, and Congressman John Markey.

It's an incredible place for sharing.

People and organizations use private conferences too (like closed doors you can enter by invitation only) for matters sexual and salacious, or studious and strictly business. Some major Fortune 500 companies now use Parti to help corporate communications.

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# YOU CAN PUBLISH NEWSLETTERS WITH YOUR MODEL 100 AND PRINTER

A small corner in your home can be transformed into a publishing house. Mass production of newsletters and press releases is possible using the 100, a printer, and a few dollars worth of supplies.

By RICHARD RAMELLA

**Y**ou can become a publisher. For twenty years I worked as a newspaper editor. These days I'm a writer for a California hospital. The various audiences are specialized; there are even subcultures within microcosms, so I'm often asked to turn out newsletters appealing to special groups.

Thanks to the 100, these projects have never been simpler. And whether you plan a multi-page report in journalistic style, a cafe menu, a Cub Scout newsletter, or a direct mail appeal, you can profit from what I'll cover here.

**FIVE STEPS TO SUCCESS.** The secret to turning out a newsletter is contained in five steps:

- In your mind or on paper, sketch a rough plan of your publication.
- Write all the articles in a text file.
- Line print the file in a column 3.5 inches wide.
- Trim type, headlines, and illustrations and paste material on a page in a way you like.
- Reproduce the layout as many times as you want.

Concept, production, and reproduction, these are the basic steps used in any publishing process.

Yes, I left out a lot of important things in this simple list. The list will serve as a step-by-step template as we slowly go through the process.

**CONCEPT.** You should have a good idea of how much space your words and illustrations will cover. Doing a many-paged publication is a matter of



doing one page at a time, but it can run up costs. To start, keep it simple, perhaps the front and back of a single sheet of paper.

If you're producing a newsletter, it needs a name and should be printed in the largest type size used in the publication. The name and such information as date, volume number, address, are called the masthead. For an example of a masthead, turn to the cover of this magazine and note how the name PORTABLE 100 stands out. You might consider drawing the masthead in large type or using your firm's logo if it has one.

The next step is rather vague. Consider how much space you have left after the masthead is in place. Then come up with enough material to fill it — easier said than done!

**WRITING.** If you're a beginner, this will help you get started:

Turn on the Model 100.

You're in menu mode. The word BASIC in the upper left corner has reversed letters with a dark cursor over it. Press the right arrow key and the dark cursor will move right to cover the

word TEXT.

Press enter.

A prompt appears. It reads: File to edit? Your answer must be in six or less characters and becomes the name of the text file. Answer the prompt and press enter.

Now type material into the file. For specific word processing instructions, refer to the computer's manual, pages 43–60.

I suggest all articles for one publication be put in a single text file. At the top of each article, type a two- or three-word description or "slug" you can remember. Later, you can use the string search function to find specific articles quickly.

If all the material for one publication exceeds the capacity of your computer, save the material to a cassette tape for later use, kill the text file, and continue writing in a new file. The manual explains this.

**LINE PRINTING.** Let's look at your particular line printer. The aim is to have the line printer format your article's type in a column which is 3.5 inches wide. Two such columns fit neatly side by side on standard 8.5 inch-wide paper.

On the 100 keyboard, depress the shift key and the print key at the same time. A prompt will appear at the bottom left of the screen. It asks: Width: . Type 40 and tap enter. The line printer will print the file on paper. Measure the width of the column of printed type. You're hoping it's about 3.5 inches wide. If so, your line printer is printing at about 12 characters per inch, perfect.

If the column width is less or greater than 3.5 inches, refer to the line printer manual. Look for material on cpi or characters per inch. Most line printers have some way of varying type width. Some dot-matrix printers can scale type width up and down between two extremes. Some letter quality pctl printers offer 10 and 12 characters per inch, as well as proportioned spacing of letters.

If your line printer won't in any way translate a width of 40 characters into 3.5 inches, the only thing to do is print the columns in another width. Go back to the test text file and experiment, printing in various widths until you find the magic 3.5-inch column on your line printer.

**RAGGED RIGHT.** The 100 prints in a style where the left edge is straight,



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## NEWSLETTERS



28, 1983

# NEWSBRIEFS



From the CHIEF:

upcoming Thursday noon conferences:  
Nov. 3 - "Management of Blue Effects  
With Hyperemesis," Charles Whitcomb.  
Nov. 10 - To be announced.  
Nov. 17 - Clinical pathological  
conferences.  
Nov. 24 - Thanksgiving.  
Other gatherings:  
Dec. 1 - Medical Staff meeting at  
12:30 p.m. at Community Hospital.  
Dec. 5 - "H2 blockers Revisited," Eric  
Ford and Richard Zak.  
Dec. 14 - 18th Annual Northern  
California Conference, all day in the  
Enloe Conference Hall. Brochures will be  
sent on this gathering.  
—ERIC FORD, Chief of Staff

**Blue Cross PPO  
offer filed away**

James P. Greeney notes  
recently approached by  
several providers  
from Bayer

CODING



There's gotta be a code for this somewhere in here

Pat Tornhill, director of Medical Records, invites medical office personnel to "brown bag it" with her at Enloe for lunchtime sessions on coding problems.

"In Medical Records we have one part-time and four full-time coders with total experience of 30 years," Pat says. "Butte-clenn Medical Foundation is requiring coding now and it's a fairly new situation to some medical office personnel. We want to help anyone interested may call me at Enloe extension 7615, and we'll set up a meeting. Medical office people may bring coding problems with them." Pat teaches a medical records course at Butte College, and its current topic is coding. "I'm teaching coding by ICD-9CM, which is the abbreviation for the system which contain coding volumes," she says.

but the right is not. I think this is esthetically superior to word-processing programs which justify type within a line to even the right margin. Such maneuvers tend to put too much space among the letters and words, creating a rather gawky look.

If you can print a 3.5 inch column adhering to the 40-character width on the text screen, you can easily hyphenate words because the type's screen appearance is the same as it'll be when printed. Hyphenating saves space and makes the right edges of the type more even. Breaking words between lines isn't good style in manuscripts, thesis, or reports, but is just dandy in journalism.

Before you dump the type to paper, there's one more thing to cover. Some printers will produce varying lines per horizontal inch of printing: six, eight, 10, whatever. Experiment here. It's a way to compress material or pad it, depending on your need.

**PRINTED ELECTRONS.** Now you've written your clean copy; it's time to turn it into ink. If at all possible, use a carbon or fresh fabric ribbon on the line printer. It'll help you get the best possible reproduction.

For the final steps, you'll need the following. Even if you have to buy everything listed, I think it'll cost less

than \$10. See the illustration with this article for examples.

**TOOLS AND SUPPLIES.** The first tool needed is for trimming paper. Some use a single-edge razor and cut themselves. I recommend a wallpaper knife or an X-Acto knife.

You'll also need a ruler with a metal edge to guide you when cutting. Professional printers use a ruler called a pica stick or line gauge. A wooden ruler with a metal strip usually has the metal seated too high on the edge to be precise when cutting. A thin metal ruler is best and safest.

To paste down the paper-type and other layout elements, use glue. For small jobs I recommend a Dennison Glue Stic, about 80 cents. For big projects, use Scotch 3M Spray Mount, an artist's adhesive, about \$8. The Glue Stic allows for easy unpeeling for repositioning type. Pro-printers use wax machines, which spread an even coating of hot wax on the reverse of the paper to be pasted. Hot wax cost is high, and the wax can permeate porous paper.

Layout sheets will help you keep all type and other material straight on the pasteup page. The mark of the bad printer is crooked type which often isn't spotted until the job is complete. Layout sheets are gridded sheets print-



ed in a pale blue ink that don't reproduce in the printing process. They're called "fade out blue grids," and "non-repro blues" and are available in stationery and graphic supply stores. Buy the 8.5- by 11-inch size and expect to pay \$3 to \$6 for a pad of them.

Liquid Paper correction fluid costs less than \$1 and is nice for eliminating smudges.

**LAYOUT AND PASTEP.** When all of your type has been set on the line printer, use the cutter and the ruler to trim it as squarely as possible.

If you plan illustrations, they should be continuous line art and not photographs. This is important. Line art is made of black and white and has no shading — a cartoon for example. A photograph has shading. Using a photograph calls for a halftone negative — a professional printing process which puts dot pattern in the art so it reproduces evenly. Look at a newspaper photograph closely and you'll see the effect. Copying a photograph on a copy machine can be done with fair to marginal results, but offset printing reproduces only a sheer black and white version which lacks the original's quality and shading.

For each page of your newsletter, place one sheet of layout paper on the work area. Now play with different illustration arrangements and the blocks of paper type. Room must be left for the masthead and headlines above the stories. As you arrange the two-column page, leave margins of about 5/8-inch on either side of the copy blocks. This will provide a snug but ample white gutter between the two columns.

**JIGSAW PUZZLE.** If you have trouble getting your elements to fit the page, you can cut a four-inch story into two-inch parts, put them side by side, and run a headline across the top of the two columns.

There are whole books written about layout style. What counts in your effort is that the material is arranged in an easy-to-read manner.

If your newsletter is to be mailed, leave a blank area for the address so when the newsletter is folded for mailing, it'll show.

Though it might not seem possible at first, you'll find you can eventually make all your material fit the allotted space. If there's too little, plan larger headlines and more white space around the stories. If there is too much, edit

**FUN GROUP** -- You WILL have fun at this year's Enloe picnic, and here are the reasons why. They are members of the Picnic Committee, from left: Jill Paulini, Diane Chapman, Helen Polian, Kathy Skaggs, Michele Godani, Joe Persons, Andrea Demetras, Jayne Mulkey, Norm Fox and Forrest Rogers. Not pictured are committee members Beulan Astle, Lamont Province, Dolores Ledesma, Kathi Cowsett, Mary Briggs, Marilyn Sanders, Hyma Eldred, Joan Darby, Dext Petersen, Catherine Goggia, Dorothy Mattson and Joel McKey. They've all given a lot of work and planning to make the event go well.

**Enloe picnic July 22**

The annual Enloe picnic for employees and their families will start at 5 p.m., July 22 on the grounds of the Elks Lodge off Manzanita Avenue in Chico. There's a country theme this year, so you might dress accordingly.

Supper will be served starting at 6 p.m. Everything is provided, including eating utensils. As last year, a streamlined serving plan has been developed to make the food lines move smoothly. There is a covered eating area.

Beer, wine and soda will be available at the event. The Elks Lodge grounds has an excellent playground for children. There will be bingo for all, volleyball, softball and the annual egg toss contest.

The picnic will run until about 9:45 p.m.

Be sure to turn in your reservation card.

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By VICKI TULLIUS.....

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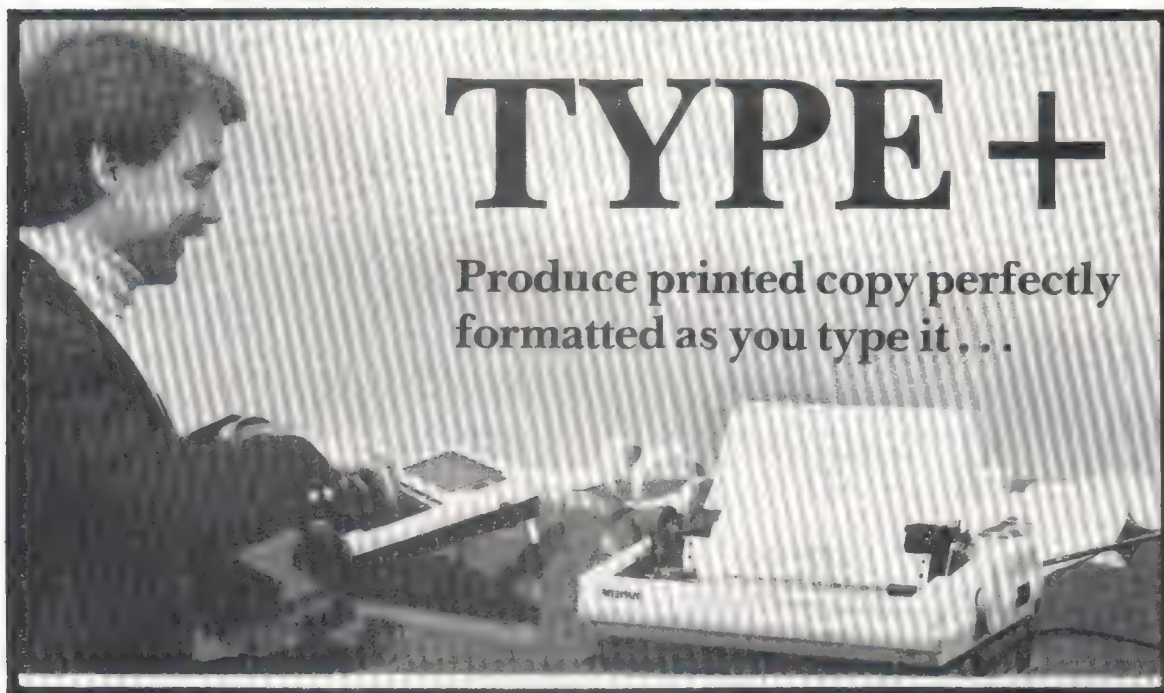
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Fantastically, everything you type is stored in a **.DO** text file. You set the margins, left and right. Paper feeds automatically into the printer with a function key setting.

A screen buffer that you control, allows you to view your last line before it goes to the printer. You can set the

screen view area from an entire line of characters to one word to immediate print as you desire.

You can send the text to the file formatted as you typed it, or unformatted for less memory consumption (if you send it unformatted you can format it with **SCRIPSIT 100**). <sup>TM</sup>

You have features for word processing that you thought were missing. For example: full **TAB** control, you set as many as you want, where you want them, with a function key, automatic centering of words or phrases, on and off with the function key.

Everyone who starts to use **TYPE+** is immediately addicted. We have heard the statement "I'll never use **TEXT** again to write a letter," from every per-

son who has used the program.

Other comments from users show us that this is a very logical method of generating a document. You are creating it and seeing it on paper, but you're also writing it to memory at the same time so that you can edit what you have created any time you wish.

The use of the function keys in this program will amaze you. You can right justify, set margins, underline, do bold-face print, on any printer, all with function key switches, (no control codes to look up and enter).

You will love this program. We honestly got rid of our typewriters. You will wonder why this concept hasn't been done before. It is the logical way to create a document.

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## NEWSLETTERS



material judiciously and redump the paper type if necessary. Some stories can be shortened just by cutting off the last paragraph. That's the way newspapers do it.

**HEADLINER.** When everything fits, you're ready to work on your headlines. Some line printers have dot-addressable graphics that with the right software allow for printing type in a variety of large fonts. The old Radio Shack Line Printer III will print type in a larger size simply with a LPRINT CHR\$(31).

If you have a daisy-wheel printer, you might print body type in one font and use another font in all-capital letters for headlines. You could also use type which comes in a variety of sizes and styles on acetate sheets. Available at graphic art supply stores, these letters must be lightly cut from the sheet one at a time and pressed to paper. I use a brand called Formatt with good results. If you use acetate type, lay the headline on a separate sheet of blue grid paper, then cut out the entire headline and lay it on the page you're assembling.

I presume you will use the Glue Stic or a similar product when doing the actual pasteup work. And at this point all elements are positioned where they will be pasted, and the beautiful blue right angles of the layout grid become useful.

**LINE UP AND SEND OUT.** Establish a corner point for laying down the first element. Take the element and put it face down on a clean sheet of paper. Lightly run the glue stick along each side, letting the glue overlap onto the clean sheet. Next, describe an X with the glue and position the element where you want it. Look closely to be sure it's in line with the grid and its edge is at the margin you want. When you're sure, use the heel of your hand in a rolling motion to secure the element to the page. Rubbing will smudge the type.

All pasted up, you're ready to mass reproduce. The most economical means of mass reproduction is usually your neighborhood "quick print" shop. You've produced camera-ready copy which the print shop can reproduce using the offset method for approximately four or five cents a copy, depending on the number you order.

If the newsletter is going only to a few people within your organization, it's feasible to reproduce it on an office copy machine.

**CONGRATULATIONS.** You are now a publisher. But you still might have questions. If so, a self-addressed, stamped envelope will get you an answer. Send it to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926. ◀



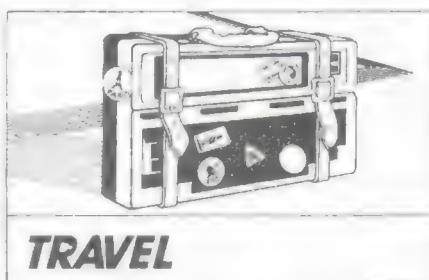
# AND NARY A BEEP WAS TRANSMITTED FROM THE PEOPLE'S REPUBLIC

Although most of us think of the Far East as a haven for computers, this traveling journalist found it no Shangri-la for his 100.

By ODD DE PRESNO

**T**raveling in China, Hong Kong, and Japan is a challenge for the Model 100 user. You can look forward to problems with voltage, modem compatibility, communications quality, along with the expected language barrier. Even people speaking computerese won't always understand you.

**FIRST STOP.** Peking is different from Western cities: There are millions of people on bicycles wearing green and



blue, uniform-like clothes; Chairman Mao's picture; The Great Wall; Forbid-

den City; Summer Palace; strange. San Francisco's Chinatown is as foreign to Peking as New Orleans is to Anchorage.

It's November and as cold as it is in Minneapolis. My 100 modestly flashes red to warn me about its weak batteries. A guy in Hong Kong had told me everything from towels to film to flashlights should be brought along. I had taken his advice seriously, so there was no crisis. Still, I wanted to hook up to an electrical source as soon as possible.

Oops, the plugs don't fit. But no need to worry. The Hotel Bei Wei produced a magnificent solution: plastic outlets mounted on a piece of wood with proper hole configuration for our Hong Kong purchased 250V multiplug. On top of the multiplug I inserted another Hong Kong unit, the 110-120 VAC to 220 to 240 VAC voltage converter. Finally, our TRS-80 AC adapter. With the surge of electrical power, the red light went out and I was back in business.

**VARIED VOLTAGE.** Lesson number one when traveling in China — bring batteries and make Hong Kong your entry point. There you can buy a multiplug for \$3 and a 115 to 220 voltage converter for \$10. The latter can take



*A helpful Japanese suggests moving the recorder away from the 100.*

Photo by Anne-Tine Verbeuren



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## CHINA



Photo by Anne-Tine Vedjosen

*When the power out light comes on, there's a scramble for a wall outlet.*

portable appliances up to 1000W, meaning you can have several items using the same converter such as a tape recorder and 100.

Traveling in Hong Kong and Tokyo isn't any easier. Unlike Peking and Canton, Hong Kong and Tokyo are two huge supermarkets. You can buy anything from electrical appliances to elephants. Only don't forget: Hong Kong is at 240V while Japan is 115V.

Most tourists are destined to live in hotels. I stayed in the Holiday Inn Harbour View in Hong Kong and found outlets for 110V, 220V, 115V, and 240V in our room. The Hotel Regal

Meridian across the street, however, offered rooms with 110V, but only in the toilet! Some hotels have 240V outlets for three pins, others for two. That's why I had to buy the multiplug, which comes with three.

I naively thought electronic problems would be at a minimum — fifth generation computerdom and all. Not so; be prepared for the unexpected. Like at the Holiday Inn Tokyo, of all places. They had only one wall outlet, and that was occupied. I needed an extension cord with multiple outlets, and the hotel didn't have one!

The next day I bought the extension



Photo by Anne-Tine Vedjosen

*The 100 is moved even farther from other electronic devices, but still no CLOAD.*



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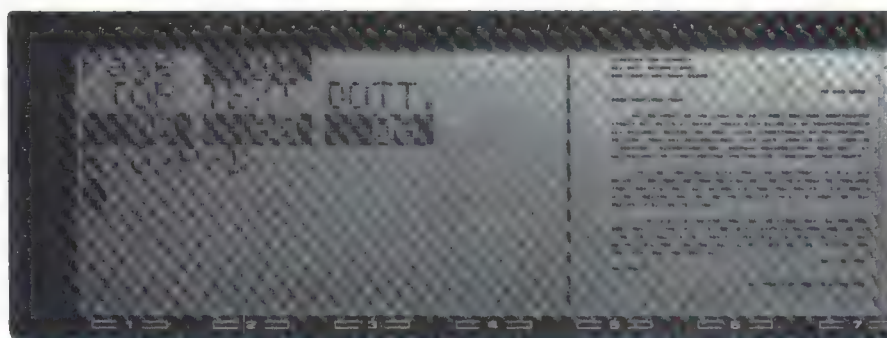
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Buying an acoustic coupler in Tokyo can be difficult if you don't know Japanese.

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cord in Akihabara. It has accompanied me on my travels ever since.

**ORIENTAL E-MAIL.** Before leaving Norway I studied several alternatives for selecting a network for electronic mail. I wanted to be able to electronically submit articles to my editors and to connect to the Model 100 Special Interest Group on CompuServe, the first being the most important.

One alternative was CompuServe via Datapak and Tymnet. From Norway

the cost was approximately \$32 per hour during standard time. My local packet switching contract, however, didn't allow such services in the Far East. I had to buy a short term Datapak subscription from the local telephone companies, unless I wanted to dial long distance.

This alternative was dismissed as impractical and too costly. I did, however, connect to CompuServe from Hong Kong. That in itself was a different experience.

**PACKET SWITCHING.** Mr. Cheung of Cable & Wireless invited me to visit his office. Since they had no dial-up facilities for packet switching, he needed an hour's notice to get me validated on the system. When I arrived, he asked me to directly connect my 100 to his communication computer. This didn't work because I'd come minus my null-modem adapter. Finally, though, contact with CIS was established through a 1200 baud modem at the desk of one of C & W's researchers.

I was connected for 40 minutes and paid \$26 U.S. In addition, I paid the ordinary CIS rates and communication surcharge. Communication quality was good.

But packet switching wasn't a good solution, so two other alternatives remained: I.P. Sharp and General Electric Information Services (GEISCO).

**SHARP NOT SHARP.** I.P. Sharp seemed attractive. It had dial-up facilities in both Hong Kong and Tokyo and the connect charge was only \$1 per hour. There was one problem however. My manuscripts had to be uploaded one line at a time, according to the Sharp people. That seemed to be too time consuming.

No one was able to help me before I left and I had no time to deal with it myself. Besides, I found the command language too unfriendly for the people who were to receive my mail in Norway. Hence, Sharp wasn't what I needed.

**GEISCO.** On the other hand, GEISCO offered dial-up facilities in Hong Kong, Tokyo, and Osaka. The service was much easier to use and I had no problems uploading large text files. I tested thoroughly the communication link before leaving Norway and it worked. The cost was approximately \$15 U.S. per hour in connect charge plus additional charges for data storage. (By making short term agreements, you might escape the minimum monthly charge.)

All mail had to be sent on 300 baud since 1200 baud was too quick for my 100. Characters were lost on the display, and my downloaded files showed the same thing was happening.

My communication parameters were 37E1E. After log on I had to enter:

TYP6  
SET F19,17

This was to make sure I didn't lose

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characters in the process and to move the cursor to the left margin on the 100 display.

**DEMT.** I stored my messages as ordinary files on GEISCO's computer instead of using their electronic mail facility. It was cheaper. Besides, I didn't need the mailbox features. There was only two of us communicating, a person in Oslo, Norway, and me.

To upload my 8000 character text files I used GEISCO's DEMT command (data entry mode from tape). After uploading the message I was to hit break. But since GEISCO didn't recognize my break signal, I had to define another key as break. This was achieved by entering SET B@. Whenever I pressed @ I would get out of the data entry mode. Save file name finally concluded the session.

**SILENCE.** In Red China, my 100 was silent. I wasn't able to send a single *beep* out of the country. The quality of the telephone lines was such that ... you know what I mean. Acoustic coupler? Forget it. Even though the Chinese have a large computer industry (the 100 met with an IBM clone called Great Wall 100), when they talk about communications, they mean local area networks or leased lines on an experimental basis.

Data communication in Hong Kong and Japan is CCITT and not Bell. Hence, my Radio Shack couplers remained in the suitcase together with my direct connect cables. They just don't work on a CCITT-line.

I tried to use it from my hotel room, but no one around had a coupler. Several people nodded intelligently, and uttered, "We'll call you tomorrow." But no one ever did. That was as far as it went in Hong Kong.

**BACK TO GEISCO.** Instead, I developed a working relationship with GEISCO's local service center. I simply walked in there, opened my briefcase, took out my 100, and connected it to their modems, uploading my files. It took five minutes, a smile, and a handshake. No money. The computer costs were supposedly charged to my account elsewhere.

It was simple and efficient. Communication quality was good. If my computer didn't work, I was offered to borrow their terminals free of charge. The office was a five-minute walk from my

hotel in Kowloon. It was great.

I did the same thing in Tokyo, and again met smiling and helpful people: "Would you care for a cup of coffee, sir?" The name is different in Japan, though. Look for Information Services International—Dentsu Ltd. If you can't find it, ask at the police station in Tsukiji. And don't—I repeat *do not*—forget your RS232C cable. Their cables might not go into your 100's outlets.

**SHOPPING SPREE?** I had high expect-

tations when the 100 arrived in Akihabara, Tokyo's computer shopping center. Finally we'd be able to find an acoustic coupler, I thought.

But it wasn't that easy. First, the Japanese simply don't understand English! They don't even understand English computer lingo in computer shops. And again, their RS232C cables don't fit into Model 100s.

I was offered a coupler by GEISCO, and it worked. But the price was stiff. Finally, I found a coupler for the NEC

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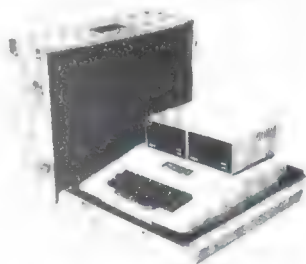
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## CHINA



The Model 100 takes on vice chairman of China Abacas Association in Peking.

8201A priced at \$178. But nobody seemed to know how it worked and the documentation was all in Japanese.

Late one evening, after a three-hour effort, one shop attendant called me at my hotel. It worked! (He was the first one who understood the unit runs on rechargeable batteries. You can use the AC adapter, but it isn't good alone.)

That was the end of our visits to

GEISCO's offices. From then on, all text was sent from my hotel room whether in Tokyo, Tsukuba, or Osaka. And, I'm happy to report, the coupler also works in Norway

**HOW COUPLER WILL TRAVEL.** A coupler is a nice tool for the traveling 100, especially when you travel internationally. Many hotels have business centers,





but none of them carry modems for visiting computers. You also can expect to meet the "modern design problem." The telephones of 1984 come in many shapes, and few of those can be used with an acoustic coupler. You simply can't press a square mouthpiece into a round hole.

The trip lasted for 45 days and more than 100,000 characters were sent elec-

tronically between Asia and Norway. It's certainly possible to travel with your 100 in the Far East, provided you're prepared. Bring your modem cable, battery recharger, extension cords, penlites, acoustic coupler for CCITT, AC voltage converter, and multiplug. And don't worry. You'll be able to fit it all in your suitcase, and be able to carry it too. ◀

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# REVIEWS



## RENUMBERING ENTERS FAST LANE WITH RENUM.CO

### **Model 100 Renumbering Program**

General Business Systems Inc.  
1420 Main St., Suite 130  
Glastonbury, CT 06033  
\$30

By DAVID DUNN THOMAS

**R**ENUM.CO is fast! For this Model 100 user, who has never used disk nor any other system, it's fantastic.

Other Basic renumbering programs for the 100 take from 4 to 20 minutes to finish files and operate only on text files. In comparison, this program gets you 2- to 67-second action because, as an ad from General Business Systems states: "The program is in machine-language and requires about 2800 bytes of memory. It processes a Basic program in [tokenized] form, renumbering it in place. It uses free RAM for its tables, so the number of lines it can process is only limited by the amount of free RAM."

**IN OPERATION.** When running, RENUM uses 2778 bytes for its command file, 534 bytes for file buffering (MAX-FILES=2), and 2774 of reserved memory. When not in use, but in residence, it only requires the 2778 bytes.

What it adds up to is a highly efficient, versatile, and fast renumberer (see table 1.) While running tests on eight Basic programs of various lengths, it performed flawlessly. When forced, the appropriate error message appeared.

One such error message is Fatal Error, defined as one that ends processing with the Basic file left unchanged. One wonders what word would be used to describe an all-files destroyed situation.

FILES	LENGTH	LINES	BRANCHES	SECONDS
GMAIL3	4915	98	81	15
TOOLKT	4148	104	128	26
PRETTY	2085	44	41	7
XREF	3516	94	58	19
MINIVC	8938	197	247	65

Table 1. RENUM.CO Testing Table

Starting to renumber in the middle is very simple and a good way to test the non-fatal "Undefined line..." and "Can't replace..." errors. In these cases the file is processed but bad numbers are replaced with asterisks, a definite improvement over being left in place as is.

**ACCURATE AGILITY.** Testing has shown RENUM.CO to be accurate as well as fast. Reprocessing files known to be inaccurately renumbered by some other Basic program was done without error. Proofing was done by running processed files; MINIVC.WM3, a spreadsheet program on Compu-Serve's Model 100 SIG, was subjected to RENUM.CO six times and then ran error free.

The documentation is excellent, and I'm sure a person loading a machine-language program for the first time would have no problem with the cassette-use instructions. The creation of backup copies is advised and explained. This wasn't tested since my one loading from cassette was promptly backed up on wafer via the Portable Micro Drive system.

Operating instructions include a precise explanation of how to create a 12-byte Basic program to LOADM and run RENUM.CO as well as how to run from the system menu. The program's prompt and response messages are then detailed, making instant use of the program very simple. Error messages

and necessary corrective action end the documentation.

**A BLESSING.** For the Model 100 user who does any program editing at all and has no other system, RENUM.CO is just the ticket — if not a *must*. Traveling users who make modifications/enhancements to programs on the road will find it a boon too. ◀

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by MARY JEANN BATHAM

**F**or developers or property investors, this program is designed to calculate the variables involved in any business purchase you make. Real estate personnel, home owners, and home buyers also can benefit.

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The character font style is Elite 12. The printing system is by a 5-wheel impact unit. The printer uses standard typewriter paper, 8-1/2 inches in width by any length. The computer interface is Standard Parallel (Centronics Compatible). Printing is bi-directional. The DataPort printer is FCC approved.

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- \*\*Column width is 80 characters. The column you're reading is 66 characters-per-line.
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Cost of the printer is \$295.00. That's not a printing error, it really is TWO-HUNDRED AND NINETY-FIVE DOLLARS. Shipping, handling and insurance for orders within the limits of the Continental United States is \$15.00. California Residents must include 6% sales tax (\$19.18). The printer has a full-coverage warranty for 90 days from the date of purchase.

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Alternate mortgage rates, depreciation methods, capital improvements, and exchanges can be input to determine the effect these variables have on the analysis.

According to the manual, the program doesn't require a great knowledge of computer operation. No function keys are needed, and the user needs to know only where the numeric row, the Y and N keys, spacebar, and enter key are located.

**GOOD OVERVIEW.** The first two chapters of the manual explain program overview and explanation. Chapter three shows all the mathematical formulas used to run the program. Listings of the algebraic functions are given, and the formulas are very sophisticated financial calculations.

Chapter four gives a step-by-step explanation of program operation. I had the choice of outputting the results to a display (the default) or to a printer. The program will calculate monthly payments based on mortgage value and interest rate previously input. This is a nifty feature if you don't have a mortgage chart handy.

The printout is very comprehensive. Year-by-year information on expenses, interest, income, and before-and-after cash flow are shown as well as a summary of costs, depreciation, mortgage balance, capital gain, and proceeds. The effect on personal taxation is calculated also.

When you're through reading the output, you have the option "exit (Y/N)". Since the program is written for non-technical computer users, how about "return to menu" instead of exit?

**SOME THINGS MISSING.** Chapter five gives a sample program with a dash of humor. The authors referred to the investor as John Dough, and the lending institution as EZ Bank. However, for us non-technical users, I wasn't impressed with the instruction in chapter five that reads: "For each Process Instruction Step (labeled P.I. STEP) listed here, there is a reference to the appropriate Program Operation Step (labeled P.O. Step) discussed in Chapter 6." But where's Chapter 6?

Appendix A listed very complete downloading procedures for the 100 and NEC so the first-time user easily could figure out how to load the program.

Appendix B, input and output, stated: "Although input and output are presented in Chapters 6 and 7, they are summarized here to assist you in determining what kinds of data are needed to run the program..." Wait a minute, I couldn't find chapter six, and now chapter seven is missing too!

Appendix C's error and status messages explain all possible errors encountered when running the program.

When you put that comma in the number and the "invalid input data" message is generated, the correction procedure is "enter data that is valid." How about adding: "Leave out the comma, and the program will work."

The glossary in Appendix D offers a good explanation of specialized real estate terms. However the same author of chapters six and seven must have written the glossary. Most of the explanations were okay, but I'm still confused by the definition of a tax bracket: "...that part of a classified, graded tax grouping that falls within a certain specified interval."

The recommended readings listed in Appendix E noted several accounting books, a finance book, and Radio Shack and NEC instruction manuals. But not one real estate reference book was mentioned.

**MEMORY EATER.** The program chewed up 13K of memory. The subroutines were numbered from 10000 to 50030. Too bad the authors didn't read *Portable 100's* suggestions on packing line numbers. A lot of bytes could have been saved if they'd used better programming techniques.

I tried to buy my house using the program, but ran into a problem. Prompt (15) asks for the depreciable value of the building, but homeowners don't depreciate an owner-occupied house. I tried to enter zero but kept getting an error message. Putting \$1 as a depreciable value threw off all the calculations. I guess homeowners would use this program only to calculate mortgage amounts.

I would have preferred a separate prompt for real estate taxes. The pro-

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gram ignores taxes, but they could be shown as annual operating expenses. Also, the software assumes that operating expenses, income, and vacancy rate increase at a fixed rate over the period the property is owned.

**NO RAM FILE.** I was disappointed the program did not open a RAM file to save my calculations. I would have liked to bring back all of my calculations and look at the program again, changing the mortgage amount, or changing the interest rate.

Since no file was created, I had to re-type each number to recalculate even if I changed only one of the variables. I couldn't save the file on tape, either. Run it once, output to the screen or to the printer, and that's it. Make sure you have a printer attached, otherwise you're forced to memorize the calculations on the screen.

**GOOD, NOT GREAT.** The program is easy to use and would be good for field approximations of property potential. An industrial real estate broker could use this on the job since it's simple and doesn't require all the alternatives an in-house manager or an acquisition specialist might insist on having.

The output is fast and easy to understand. The emphasis is on after-tax income and capital gains, rather than on a comparison of the value of this property as opposed to the investment down the street.

The program is a good introduction to more advanced spreadsheet applications, is reasonably priced, and offers simplicity and ease of operation. All it needs is a file-creator, then it'd be great. ◀

## ADVANCED MATH IS KID STUFF WITH AMPI RPN

### RPN Calculator

American Micro Products Inc.  
705 N. Bowser, Suite 155  
Richardson, TX 75081  
214-238-1815  
\$29.95

By WOODY LISWOOD

**D**o you yearn for your old Hewlett Packard calculator with its Reverse Polish Notation system? If so, RPN Calculator was made just for you. Here's a program which takes your Model 100 or NEC 8201A and turns it into a Reverse Polish Notation calculation machine complete with stacks, operators, and everything else meant to confuse those of us who like algebra.

**EASIER THAN 2 + 2.** Hold on. Just because I can't think in Reverse Polish Notation doesn't mean the program isn't good. In fact, the program is excellent. Since I don't have another calculator program for my 100, I often use RPN Calculator.

What is RPN, you say? Well, here is how I add two plus two with my regular calculator: I enter a two, then plus, then two, press the equals sign, and four appears. With RPN I enter in a two, I enter in another two, and lastly I press the plus and the answer four appears.

**LIKEABLE.** The documentation is writ-

ten in a language I understand. Through illustrations showing the screen, it leads you through sample calculations so you can comprehend the works of the program.

The program also displays all the registers and functions on the screen so you can keep track of them rather than memorize them. The documentation says it better than I can:

"Notice that the screen has been divided into four zones. The first zone located in the left corner of the screen contains the stack registers titled T, Z, Y, and X. The second zone located directly below the first holds the six calculator selection options. The third zone located at the bottom left hand corner of the screen houses the five function operations keys: RUB, NXT, SEL, END, and CLR. The fourth and final zone positioned in the right corner of the screen holds the calculator operation keys.

**WHAT IT MEANS.** Each time you enter a number it goes into the bottom register and the number in that register bumps automatically into the higher register. When doing calculations, it works like this: You want to add 10 and 7. You enter in 10, press return. You enter in 7. The 10 moves to the Y register and 7 appears in the X register. You move the cursor keys to position the cursor over the + symbol. Press the space bar, now 17 appears in the X register and the Y register is zero.

Sound complicated? Well, maybe the first few times. But after that there's some crazy sense as to why you'd want to do things this way.

**FEATURES.** The RPN Calculator has a

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GO PCS-154 at the prompt.



variety of built-in functions. Each causes different menus to appear with-in parts of the program.

*General* allows you to have the RPN calculator.

*Sum/Avg* allows you to quickly average and add numbers while the registers take on different meanings. The total is held in the Y register, the average is displayed in the Z register, and the number of entries is shown in the T register. The X register holds the latest value. In addition, you always can display X as a percent of Y in the T register.

*Exponential* provides four functions: natural logs, logs to base 10, natural logs raised to the X power, and 10 raised to the X power. Wow. I haven't used logs since college and slide rules, but perhaps you need this. You enter the number in X, then use the selection keys for the calculations wanted.

*Trigonometry* gives you three trig functions: sine, cosine, and tangent, as well as providing pi. The operator keys here are degrees, radians, sines, cosines, and tangents.

*Growth* allows you to compute the growth of an investment assuming different rates. You enter in base, the

growth factor, and the time period to get your result. No, it doesn't do present values.

*Mark-Up* might be relatively handy if you own a store. You know the cost of the goods and the mark-up needed to make a profit. With RPN calculator in this mode, enter in cost, enter in percent of profit, and discover your selling price.

*Percent Change* is an interesting device. Here you enter two numbers and the calculator will give you the second number as a percent of the new number.

**HELPS TEDIUM.** RPN Calculator is an interesting and useful set of functions all within the Reverse Polish mode of a built-in calculator. Each of the functions probably could be done just as quickly in the general mode rather than the individual modes, but the built-in functions, with their automatic methodology, might be handy when doing the same calculations over and over again.

The program works quickly and smoothly. If you must live with RPN, you'll like RPN Calculator. ◀

## CURVE FITTING CAN GIVE YOU EYEFUL OF FUTURE

### Curve Fitting

American Micro Products, Inc.  
705 N. Bowser, Suite 125  
Richardson, TX 75081  
214-238-1815  
\$65

By WOODY LISWOOD

I suspect if you need to ask: "What on earth do I need a curve fitting program for?", you probably don't need one.

On the other hand, this program is so easy to use and logical in its construction, that perhaps you might spend time with it and find a variety of uses, even if you've never taken a statistics course.

**CRYSTAL BALL.** One of the main uses of regression analysis is to predict the future. For example: You've been paying insurance premiums for years and want to do some planning for the next

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year. So you quickly enter the premium you've paid for the past five years.

Then you generate a set of curves through that data to see which type of curve best fits. Finding that, you let Curve Fitting predict the following year. Of course the assumption is that next year'll be pretty much like past years and that nothing untold will happen. Then, if the premium is much larger or smaller than you might expect, you have data with which to question your agent.

To most folks, that's what curve fitting is. Without going into the mathematics, you have a set of data about which you want to ask questions. By using statistical formulas to manipulate and analyze that data, you can make inferential assumptions based on the data.

**BETTER THAN MOST.** Curve Fitting works better than some of the programs available for the micro marketplace. After entering a data set, you get a fit for:

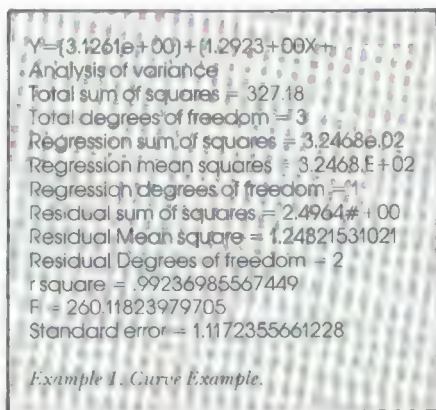
- Linear
- Exponential
- Logarithmic
- Power

In addition to calculating the curve fit for each of these types of curves, it also

plots the scatter gram and best-fit line through the data on the screen.

Curve Fitting also runs on the NEC 8201A. If you have one, as well as the NEC 8023A-C printer attached, you'll also be able to print plots.

**INPUT, OUTPUT, AND RUN.** The input sections work smoothly. The program prompts you for each X value, then for the corresponding Y value. Depending on the memory available in your machine, you may enter up to 200 sets of data points. After entering the data, you can save it where you want or continue with the analysis.



Running the program is easy. You answer yes or no to each type of curve, then answer yes or no to whether you'd like to see your data graphed on screen.

For regression outputs, the first thing you see is the equation used for the fit. For example, the formula for a line is  $Y = A + BX$ . That is, the point on a straight line defined by Y is equal to the Y intercept (or where the line crosses the Y axis, plus the X value multiplied by the slope (B). An example from the documentation can be seen in example 1. You then see the results graphed, followed by additional curve fits.

**INSTRUCTIVE.** The documentation is very easy to read, use, and understand. Each section of the program has a discussion of the formulas used to calculate the statistics as well as complete examples of data and how it could look on the screen. There also is a discussion of the meaning of each of the calculated statistics, making the documentation both instructive and descriptive.

An easy to use, straight forward program, Curve Fitting does what it's supposed to do. It didn't bomb or hang up during my work with it, which says a lot. ◀

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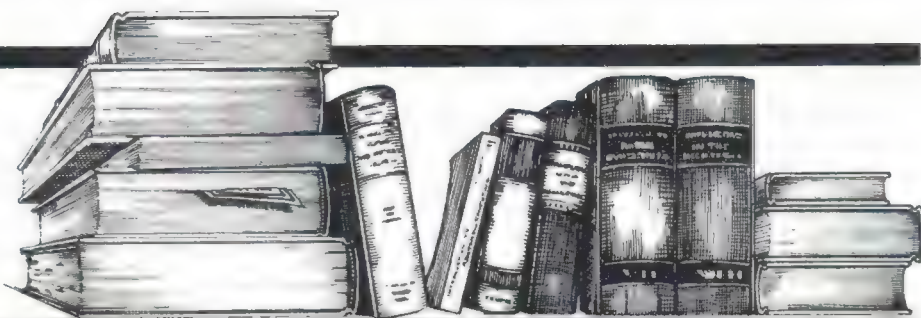
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# BOOKS



## A SAMPLING OF PROGRAMS FROM SIG.100

### *The Model 100 Companion, Business and Entertainment Programs for Portable Computing*

Compiled by the Editors of Osborne/  
McGraw Hill  
Osborne/McGraw Hill  
2600 Tenth St.  
Berkeley, CA 94710  
150 pages  
\$15.95, softcover

By TERRY KEPNER

Unlike most Model 100 program books, this one is a compilation of programs from many different authors, but almost all are from the same source: CompuServe's Model 100 Special Interest Group data base. Since the Model 100 SIG data base has literally hundreds of such programs, the 27 published in this book represent the cream of the crop, with an average length of about 2.5K.

The book is divided into three sections: applications, entertainment, and utilities. It also has two appendices: one on downloading programs from CompuServe, the other on the various programmers' biographies.

Because these programs were taken from the Model 100 SIG data base, versions of these programs still are available. If you have a 100, a 100 telephone cable, and membership in CompuServe, you probably could download these programs without first typing them into your computer. Most are fairly short and wouldn't take much time to do. The problem is trying to find the specific program you want from hundreds in the data base.

**WHAT'S IN IT.** The first section in the book deals with programs for applica-

tions at home, on the job, or on the run:

- Monthly Calendar displays the current month in calendar form, with options to move through the years;
- Days Between Dates calculates the days, weekdays, weekends, or weeks between two dates;
- Appointment Reminder and Address File Search are much better than the Model 100 SCHEDL ADDRSS programs;
- CompuServe EMAILER provides automatic log on and Email delivery to CompuServe in a minimum amount of time;
- Text Change lets you search and replace within text files;
- Classroom Curve, a teacher's favorite, gives raw score, curved grade, SAT style grade, percentile ranking, class mean, standard deviation, class curved mean, and how much one standard deviation point is in scored points;
- Text File Addition adds rows and columns of figures in a document file;
- Checkbook Statistician organizes your checkbook;
- Calculator performs standard math, hexadecimal, and octal, hexadecimal, and decimal conversions;
- Mailing Label prints two-column mailing labels from names in a document file; and
- CompuServe Stock Quote dials, logs on, and retrieves nine New York Stock Exchange closing prices at a cost of two cents per closing price plus CompuServe time.

**NICETIES.** Any one of these programs would be worth the price of the entire book. They're all well-written. Teachers especially will appreciate the grading curve program.

The programs list the required hardware and RAM needed, so if a particular program needs 5K of RAM, and a printer is required, you're warned before you start typing in the program. Also, all the programs are listed on a daisy-wheel printer, which means no

typographical mistakes from a typesetter, and you still have solid, clear print.

Another plus for this book is the paper: Low-glare and high grade. Your eyes will be thankful after only a few minutes of typing.

**GAMES AND UTILITIES.** The second section is for games: Space Fighters, Towers of Hanoi, Four Seasons Solitaire, Embedded Word Puzzle Solver, Blackjack, Ricochet (like paddle ball or pong), and Music Maker.

The final section contains utility programs, programs for the programmer. These will really make life easier for anyone programming in Basic on the 100.

The first program, Model 100 Setup, lets you choose the legends you want assigned to the function keys F1 through F8. After typing this in, save it to tape. The next time you have to cold-start your computer, you easily can restore your favorite legends just by running the program again.

This next program, RENUM, is a Basic program that rennumbers a Basic program that's been saved as a document file. The result is two programs: Your old one, and the new rennumbered one.

**MORE PROGRAMS.** Basic Print Format is a program which formats the listings of Basic programs stored in RAM or on cassette. The program automatically prints the date, program name, and page number at the top of each page.

One of the complaints aired about the 100 is it doesn't put a line feed with every carriage return sent out. If you own a Tandy printer, that's not a problem. If you don't, you may need this program: Line Feeds for LPT.

If you've ever run out of room in the 100 directory, you'll like this utility: Invisible System. This lets you remove Basic, Text, Telcom, Addrss, and Schedl from the directory. These are still available, you just type their name





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### **TYPE+** \$69.95

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Underlines, and does bold-face print on any printer with function keys (no control codes to look up or embed). Right justifies at the touch of a function key.

**SCREEN BUFFER** / To allow you to edit before printing, you can control the screen buffer from 1 character to the last line.

**CENTER** / Center on / center off controlled with function keys.

**MARGINS** / Set margins with function keys. Audible end of carriage, automatic carriage return and function key Tab Set.

**DIRECT CONTROL** / If your printer responds to backspace commands, you can backspace and overstrike. Paper advances with carriage return.

With TYPE+, everything you print is stored simultaneously in a RAM file, formatted as you composed it. You can reprint instantly, or edit it in the file. On cassette with excellent, easy to understand manual.

### **TUTOR+** \$39.95

This is what we consider as the finest typing instruction program we have ever seen, on any computer. A person with no keyboard skills can be touch typing in three weeks.

Detailed manual as well constructed as any high school typing textbook. Program automatically feeds all 30 typing lessons and drills through, across the screen at graded speeds from right to left. You make letters disappear by typing them correctly.

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Also TUTOR+ has an exciting game mode. While experiencing the thrills of a space invaders type game

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Financial functions available at the touch of a key include IRR, MIRR, and NPV on up to 120 cash flows, plus any of its five annuity variables (n, PV, FV, PMT, i). Function key F2 gives a printed amortization schedule, and businessmen will love the breakeven analysis they can receive simply by pressing function key F1.

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and press enter while at the directory.

If you're curious about what's in your computer's ROM and RAM, Memory Dump will display the contents of 64 bytes of contiguous memory, in hexadecimal and ASCII. Addresses are displayed in both decimal and hexadecimal.

And finally, if you transfer data from the 100 to other computers and back, you may have noticed the 100 is slower at receiving than sending. This is because the LCD display slows down the reception. Download LCD Disabler cures this problem by temporarily disabling the LCD during a download, and letting you receive at 1200 Baud instead of 800 Baud (the amount the LCD slows things down).

**USEFUL AND FUN.** I found the book to be worth its price just for the utilities. The games are fun, and kids will find them entertaining (perfect for long trips in the car). And the applications programs are superb.

Look in your local bookstore for this one, and examine it. I'm sure you'll end up buying it, and will be pleased with your purchase. ◀

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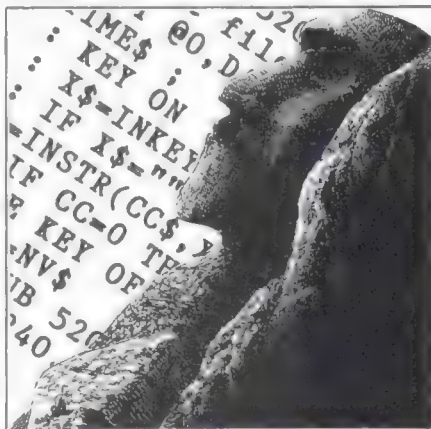
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New York, NY 10166  
159 pages  
\$7.95, softbound

By NANCY L. LAITE

**Y**ou made a substantial investment when you purchased your personal computer. Even the comparatively inexpensive Model 100 becomes costly once you start adding the trimmings: printer, modem, software, batteries. Wouldn't it be easier to rationalize your financial commitment if it were possible to recoup some of that outlay?

Well, all the justification you need is in *Moonlighting with your Personal Com-*

*puter.* Author Robert J. Waxman claims, "The only limits to your moonlighting are your imagination and ability, and the amount of time you can devote to it." And this book provides the blueprints to do just that. By outlining six fields he feels are most accessible to the computer-freelancer, Waxman promises you'll be making extra money in no time.



**FULL MOON.** The book features nine chapters; six are recipes for moonlighting in: writing, service bureaus, software packaging, contract programming, consulting, and system houses. A six-part appendix covers everything from personal computer clubs and magazines to programming languages and software distributors. The handy glossary is a terminology backup for both moonlighting and computer technology. And the excellent index puts the paperback's contents right at your fingertips so there's no need to read the book in its entirety — an appreciated trait in this age of information saturation.

"Assuming the reader has some basic knowledge about the operation of personal computers, my book is for the person who wants to spend as few as two hours or as many as 35 hours a week to supplement his or her income," prefaces Waxman. And with that, he discusses individually the six computer freelancing areas mentioned above. Each contains information on equipment and skills needed, standard fees, hours of work demanded, self-marketing techniques, and most important, the future for such an endeavor in a fast-changing field.

A rating scale for personality traits also is included so you can test yourself. No sense embarking on a career of software programming if you haven't the characteristics: "logical thinking, atten-

tion to detail, and patience," warns Waxman.

**BE THE BOSS.** General knowledge of self-employment tactics are needed regardless of choice of business and Waxman dedicates one chapter solely to what's necessary: legal and tax considerations, sole proprietorship versus incorporation, and accurate record keeping. I found particularly interesting his research on IRS specifications regarding home-based self-employment.

The author estimates more than 120,000 people nationwide already have put their personal computers working on the sidelines. He's captured the American dream, that anyone, with hard work, can make it on his own. Although he cautions readers not to shuck the security of their full-time jobs or take risks by irresponsible moonlighting, he hits home for most of us: to be our own boss, call our own hours, do our own thing.

**TOO GOOD?** I'm afraid, though, Waxman makes moonlighting sound a little too easy. Granted, he does acknowledge it requires tenacity and computer knowledge, but I feel he has anyone with a personal computer writing and selling software programs and making an additional \$10,000 a year.

Personal computers, says Waxman, are "being sold to a broad cross-section of the populace. *Moonlighting* will provide a source for use by housewives, mothers with small children, professionals in every walk of life (not just those already working in computer industries) — all those personal computer owners who want to expand earnings, learn new, valuable and saleable skills, fill their time with productive activity, or break into a new field on a part-time basis to test the waters." Sounds too good to be true. His optimism gives me that same false sense of easy success that selling Amway does. Freelancing is risky business, whether it be computer-related or otherwise.

I enjoyed *Moonlighting*, however. And if read with the pitfalls of freelancing in mind, it can be a valuable tool. The book is reasonably priced and authored by a consultant to Standard & Poor's who has been in the computer industry for over 20 years. Quite remarkable credentials when you consider most people have just discovered computing. ◀



# FULL-DUPLEX

TERRY KEPNER



*Editor's Note: Full-Duplex is dedicated to solving reader's Model 100 problems. Readers needing assistance should address their letters to: Terry Kepner, c/o Portable 100, 67 Elm St., Camden, ME 04843. Readers are reminded to include a SASE with all Full-Duplex correspondence.*

## CAN IT ANSWER THE PHONE?

**H**ow can I use my Model 100 with the Ans/Orig switch in the answer position? On page 8, the manual says if another computer is calling your computer, set this switch to answer. Is it possible to answer incoming calls automatically? What's the Ans?

Eiji Miura  
Cayucos, CA

► When two computers are communicating via modems, one of the modems must be set to answer and the other to originate. The setting of the switch determines the tone used for communication. By conventions set in previous years, the computer on the calling end should have its modem set to originate, and the other computer's modem set to answer.

It really doesn't matter which computer is set to what, just so long as they are set to opposites. If you're calling a bulletin board system, then you must set your computer to originate, as the BBS already has its modem set to answer.

No, the Model 100 can't answer the phone automatically. That function is a matter of hardware that the Model 100's built-in modem doesn't have. What is needed is an auto-answer modem, which has the hardware to detect the ring signal of the phone and to take the appropriate action of electronically lifting the handset and connecting the telephone's speaker and microphone to the computer.

## GE CASSETTE STORAGE

I have been saving both ASCII and Basic files from my Model 100 for six

months without using any motor control on my GE 3-5157A slimline cassette recorder. It doesn't have a motor control jack, and the slight inconvenience of having to turn it on and off manually has never been troublesome to me.

I have made a one-time investment attenuating the data input signal to the cassette recorder microphone jack with a shunt resistance of 100 ohms to make its signal level comparable to that of a microphone. After the original volume and tone control adjustments, I haven't had to change anything, although I have used different brands and types of tapes.

John Hicks  
Verona, PA

► You're lucky. On my Model 100 (32K) I have to use a recorder with a motor control jack. From talking with many people, and investigating other problems, it seems the memory size of your computer will affect the speed of its performance.

For example, if you load a program written in ASCII into Basic, the speed at which the wait prompt flashes depends on the size of your Model 100 RAM and the number of files currently in memory. The flashing in a 32K computer is almost 30 percent slower than in an 8K computer. If you have a large number of files in memory, the difference is almost 50 percent.

## REMOTE CONTROL WOES

**M**aybe I'm a little confused, but I thought Paul Andreasen's article, "How to Interface with Small Recorders" (*Portable 100*, January 1984, page 20), would tell me how to use my Sony microcassette recorder with my Model 100. Yet I see no mention of what I thought was the main problem: the Model 100's requirement that the tape start and stop by remote control.

Michael Coan  
Portland, OR

► Paul didn't mention how to fix the remote control problem because of the difficulty in giving a general solution applicable to the large number of cassette recorders on the market without such a control, each having its own wiring setup.

In theory, what you want to do is open up your tape recorder, find the "hot" lead going to the motor, and splice a subminiature jack in-line. Since all the microrecorders are tightly packed for space, you won't be able to mount the jack inside the recorder, so you'll have to get a subminiature jack with a casing and run two wires from it to the hot line of the motor and cut a notch in the side of the case for the wires to go through it.

Don't try to splice into the recorder at the battery power-line. That controls power to everything; so when you stop the recorder using the remote, you also turn off the recorder electronics. When the remote turns on the recorder, there's a slight lag while the electronics powerup. Depending on when the computer starts sending data, this could create a problem.

## CALLS FOR REVERSE VIDEO

**R**everse video can also be turned on with CALL 17001 and turned off with CALL 17006, or POKE 63048 with anything other than zero to turn on and POKE 63048,0 to turn off. Most of the useful ROM routines are documented in the November 1983 Radio Shack *TRS-80 Microcomputer News*.

Michael Shrout  
Greely, CO

► Thanks for the information.

## LOG-ON PROBLEM

I'm searching for any possible information about a log-on problem I have with my Model 100 and an IBM



3033 time-share system running under VM/CMS with a COMTEN front-end. The problem is that the prompt character is positioned at column 40 on the Model 100 display instead of column one. So is all output from CMS commands. In a few instances the responses start in column 37 or 38.

Dick Bayerl  
Northville, MI

► The problem is the LCD display in the Model 100. For some reason the time-share system is sending a series of control characters before each prompt. These characters are echoed to the LCD by TELCOM, and the LCD is interpreting them as instructions to position the cursor in a new location. In a normal video display, these characters are probably just ignored.

You actually have two choices: Ask the system operator to suppress the transmission of the special control codes, or buy a terminal package for the Model 100 that will trap these characters for you. Contact Traveling Software (11050 Fifth Avenue NE, Seattle, WA 98125, 206-367-8090) about their Communicator program (\$59.95), and PocketInfo Corp. (P.O. Box 152, Beaverton, OR 97075, 503-649-8145) about their Lapcom (\$39.95). If you're a CompuServe member, you can also find a communications program in the data bases of the Model 100 SIG (PCS-154), which you might be able to modify to meet your needs.

## EPSON RX-80

I need information regarding a driver program for a printer used in conjunction with my Model 100. I have an Epson RX-80 dot-matrix printer and a 24K Model 100 with standard parallel interface cable (for use with my DMP-100 printer).

N.E. Koehler, III  
Brunswick, ME

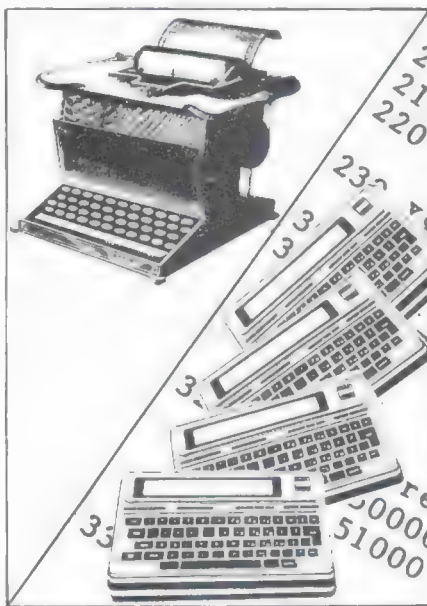
► The Epson RX-80 printer uses a standard Centronics parallel port for connecting to a computer. You should be able to just use the DMP-100 cable for connecting your Model 100 to the Epson printer. With the cable in place, you should be able to treat the Epson as a standard printer, although you may have to set the line-feed switch in the printer to automatically line feed when a carriage return is received.

## PROBLEMS, PROBLEMS

I recently purchased a Model 100, and I have been having troubles. First, I have difficulty loading any program from tape that I previously saved. The 100 will search and search and skip, but only rarely will it find and load what I want. I've used two different kinds of tape, with the same results. I've lost several good programs this way. Do you have any suggestions?

Next, I want to interface the 100 to a Model III. I have all the equipment and have interfaced using the Omniterm, but haven't found a way to download a program from disk.

Michael Capra



► First, have you tried a different tape recorder? You could have a poor quality unit that isn't recording or playing correctly. Also, if you have an old tape recorder, the tape head may need cleaning (rubbing alcohol and a cotton swab applied to the tape head will fix that problem). In any case, try out your computer with another tape recorder, and don't forget to plug in the "remote" plug to the tape recorder. Sometimes that's all that's needed to make a program load.

Second, downloading from Omniterm is easy, just use the disk file load command (F - Fill transmit buffer from disk). Then give the transmit command (O - Output from buffer) to send the file to your Model 100. If the file was originally sent from the 100 (I - Input, then S - Save to disk), you should have no problems reversing the direction. If you're sending a Basic file writ-

ten in Model III Basic, don't forget to save the program in ASCII, so the Model 100 will be able to read it correctly (that way the file doesn't contain any Model III reserved word codes that would trip up the Model 100).

## TEXTWRITER PROBLEM

I could hardly wait to try out Text-helper in the first issue of *Portable 100* (September 1983) with my C.Itoh Prowriter printer, but had a problem with it. I used it on another letter this evening and came up with strange results: The first line of each paragraph appeared to have a margin of zero instead of 20, as I selected. The remaining sentences were okay, so what's wrong?

I've been trying for months to find out how to upload and download between a dual disk Model III and the 100, using Videotex Plus. Can you help?

A.A. Nankivil  
Glendale, AZ

► The problem is the C.Itoh printer is ignoring the LPRINT SPACE\$(M) command in lines 690 and 750. Try changing them to LPRINT TAB(M-1) and see if that helps. I've heard of this problem with other printers on other computers. It has something to do with the printer carriage-return timing and codes, but exactly what the difficulty is I don't know. If changing the SPACE\$(M) to TAB(M) doesn't work, try adding a short For-Next loop in front of each of the LPRINTs I mentioned (say, FOR AN=1 TO 100:NEXT). Good luck with it.

Videotex Plus includes disk save and load commands. First make sure both computers are set to the same RS232 protocol: 300 baud, 7-bit words, 1 stop bit, even parity, and XON/XOFF set to enabled (37E1E on the Model 100). Since you're not using a modem to communicate with your Model III, you need to put a null modem in-line between the two computers. This is because both computers are transmitting data on line two of the RS232 cable and expecting to receive data on line three. You can buy a null modem from Radio Shack, or build one yourself following the instructions in the September 1983 issue of *Portable 100*. With this setup, you should get both computers working together perfectly. ◀





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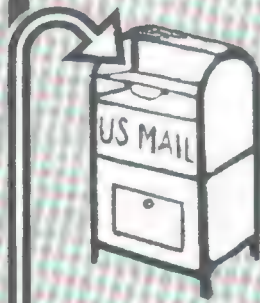


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All **Porta** series programs are supplied on cassette and require 24K RAM. Unless otherwise noted, all programs are available for TRS-80 Model 100, NEC 8201, and Olivetti M10. If ordering direct, add \$2.00 shipping and handling per order. Dealer inquiries invited.



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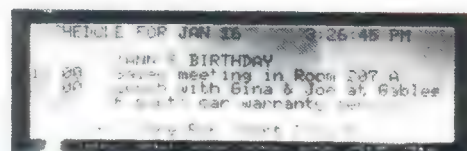
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1. LOG ON, GO EMA-1, Read Mail
2. Choose EVS/TIME
3. Press F2 to begin download
4. When done, press F2 & LOG OFF
5. Call up TIME.DO in Main Menu
6. Delete all before line #4
7. Press CTRL ↓ - for end of file
8. Delete all after "DECEMBER,31,X"
9. Return to Menu - go to BASIC
10. Type LOAD "TIME.DO", then wait
11. If DS ERROR - redo from step 5
12. When done, type SAVE "TIME.BA"
13. Also save to tape, then RUN

In addition, your user manual and surface mail copy will be shipped out within 24 hours. User instructions are not sent with the EMAIL copy. The \$7 charge for this service is in addition to the \$2 S&H. EMAIL sent by 6 PM PST date order received.

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often obscure and unfriendly, even hostile to the end user. Occasionally columns aren't merely obscure — they're weird.

I've grown to appreciate the difficulty of being an editor, and while I acknowledge how far this magazine has come, a better job of routine editing must be done.

*Portable 100* readers shouldn't have to tolerate a defective product — replete with typographical errors, content often dated or redundant, articles announced but not published, letters and responses written in pighex, and articles of marginal relevance to regular people.

Judging from complaints on the CompuServe Model 100 Special Interest Group, *Portable 100* uses a cigar box rather than a computer for its subscription list. A message that begins: "Hey, you guys cashed my check in December," rarely has a flattering conclusion.

**NOTHING FOR NOTHING.** Free programs aren't free. I'm tired of manufacturers who include software in the purchase price of what we're buying, telling us the software is free.

The software included in *Portable 100* isn't free; it's part of the editorial content that end users pay for when purchasing the magazine. The software *Portable 100* offers is as good as I've seen in magazines. It has broad application, and it's printed in a readable and copyable format.

Magazines like *Portable Computer* offer no programs at all (that I've seen), although the teasers on the cover page refer to programs, which end up being reviews of retail software.

On the other hand, *80 Micro* prints its programs in a format which is very difficult for an end user to follow and copy. Recently, I tried to copy a hex data file which was over 2000 bytes long without a single blank space. Help!

**CAUGHT IN A WEB.** So programs in *Portable 100* are much better than average. So what! What the hell does *Portable 100* think it is? Is it acceptable for a magazine to print programs that have typographical and code errors which render its programs useless to non-programmers?

Virtually no program is printed error free, and occasionally programs such as Ron Balonis' sort program are

printed with code errors which can cause your 100 to dump its entire memory. Errors like that aren't bugs — they're tarantulas.

I don't require *Portable 100* win a Pulitzer Prize for journalistic excellence. But at the same time, I think it's high time the computer industry gets the message that the end user isn't a beta test market. The products distributed, whether on a disk or in a magazine, should be fully tested and should work. At least they should be de-tarantuled.

**NOT IN CAHOOTS.** For some time it seemed to me *Portable 100*'s advertisers were given special treatment when it came to reviews and editorial content. Providing good information to end users often can conflict with the need to attract advertising revenue.

I don't believe *Portable 100* and its advertisers are in cahoots to mislead the public. To be fair, most vendors are made up of honest people trying to make a buck. Most advertisements and reviews reflect the author's honest view on the subject matter. The issue is one of perception, not honesty.

The computer industry's sense of duty to the retail customer just isn't normal. The average standard of product efficacy and reliability is miserably low. One bad product is measured against another bad product and both are considered average. Computer publications seem to be the industry's way of giving each other permission to be inadequate.

Experienced computer users are reviewing software and documentation and telling the rest of us that it's useful and usable. Their perspective is often myopic when it comes to understanding the real-world problem-solving needs of the end user.

**END-USER CRUSADE.** The problem isn't unidimensional either. Advertisers have a right to have their products reviewed without nit-picking, and with an appreciation of their priorities. Experienced computer users are entitled to a sophisticated dialog on matters of interest to them. *Portable 100* does a credible job for these two groups. However, if the magazine is to serve the needs of all 100 users, it'll have to adjust to the most oversold and underserved group — the end user. ◀

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# END USER

PETER STANWYCK



## BITING THE HAND THAT FEEDS YOU IS ONE WAY TO LOSE WEIGHT

**T**he retail computer market has three arms (and no heart): hardware, software, and magazines. No retail product has enjoyed (or suffered) the eruption of periodicals dedicated exclusively to its consumers as the computer marketplace has in the last three years. Compared to general interest periodicals, computer magazines typically are more expensive, have less editorial content, far more advertising, and generally, are far less professional in their presentation.

The difference between journalism and public relations is clearly delineated. In this genre, the typical editorial content smacks more of a trade journal for insiders than information for outsiders. Although there are a few exceptions, most notably *In-*

*foWorld*, the predictable perspective of computer periodicals is that of advertisers and vendors. Rather than watchdog for the consumer, these rags are dedicated spokespersons for the industry. Unless painfully weak advertising copy is your bag, the bill of fare usually is feeble.

**BRIEFCASE WHAT?** I bought my 100 about 18 months ago and shortly thereafter became one of thousands ordering *Briefcase Portable*. To my knowledge, *Briefcase Portable* never published a single issue, and I for one never received a refund.

After six months I uncovered the editor's (what else do you call him?) phone number and was told by a young and faltering voice that he never im-

agined starting a magazine would be so difficult. He told me he could see nothing wrong in accepting payments, and he was sure his customers would rather wait than get refunds. Since then, only silence.

Obviously *Briefcase Portable* needs some help in coming up with a plausible alibi, so I'm going to sponsor a contest to encourage your help (really!). Please send me your entries in 50 words or less titled, "Briefcase Portable's Alibi." In 90 days I'll publish the best, if any qualify.

**PUBLIC FLOGGING.** *Portable 100* has gotten off the ground, and although still shy of puberty, it's beginning to develop into a valuable end-user asset. Because it is totally specific for users of the 100, the content tends to be more relevant. How relevant depends upon who you are.

The editorial content of *Portable 100* has been aimed at the experienced and knowledgeable computer user — referred to by friend and foe as "hacker." Its subject matter and vocabulary is

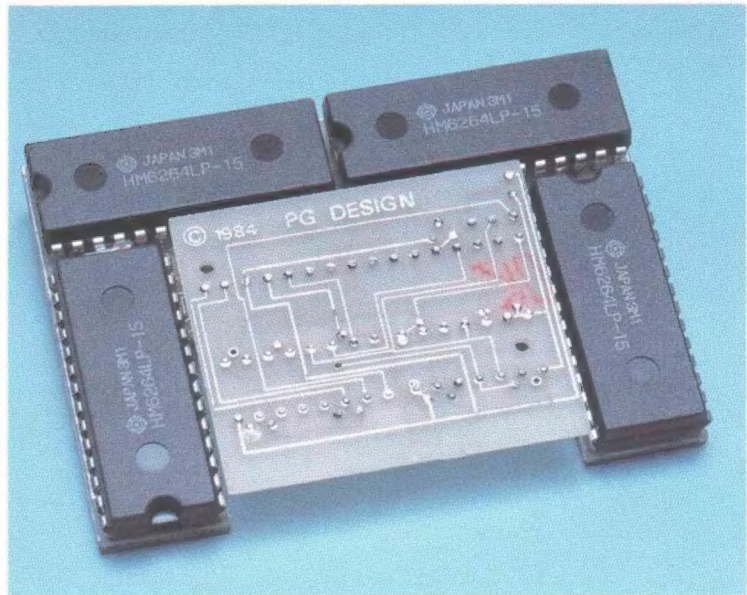
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# 32K RAM CHIPS

# FOR YOUR MODEL 100



- Expand your (8K, 16K, 24K, or 32K) Model 100 to an additional 32K.
- Store two 32K programs without having to reload.
- Each 32K is bank selectable with a single line BASIC program (programs may not transfer information between banks).
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Drive weighs only 3 lbs. and it works directly from the 110 outlet and recharges at the same time. Also you can operate it or recharge it from your automobile cigarette lighter.

Machine code programs, BASIC programs and documents all are saved and retrieved with no protocol - instantly, ready to run.

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